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BAKING TECHNOLOGY

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Applied Science
in Baking*



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No. 1

In the Ides of February

THE ides of February have a message and a task for every baker. It is to come to the American Institute of Baking February 16 and 17 or else to read carefully the trade press and all that the trade press will have to say about the conference occurring here on those dates. For the baking industry February 16 is "Tell the World Day." The conference, starting on that date, has to do with the task of telling

the baker's story to the public—not any general plan, but an intensive study of every plan any baker anywhere has ever put into effect. So that the baker who comes and throws his own plan into the

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common pot of the general discussion can take out to carry home with him that same plan after it has been cooked to pieces along with all the rest. And he can also carry away any forkful of the plans of all his associates that happens to appeal to him as something workable — something worth while to improve his own system with. The conference has been called by bakers who know that intimate and complete knowl-

edge of the baking industry and all its products is an essential foundation for the task of telling each baker's own story. The baker must find himself in the general picture of the home and all the food

that is consumed or served within it. Then the way of telling the story must be made up to conform to the methods by which consumers of food gain their new ideas. Scientific treatises are known to be useless in telling the child that bread is energy food and the fuel the body must burn to thrive. But the same scientific facts that the scientist speaks of in terms of vitamins, calories, carbohydrates, proteids, colloids, phytin and calcium and phosphorus salts, can be told to the child in the form of pretty pictures of rosy-cheeked, healthful children that got that way with bread mixed with milk or with bread and milk, or with bread and its various delightful spreads or sandwich fillings.

Tell the World Day

Anybody who ever tried to tell a story knows that he first needs the makings. With good material he can easily make a story easy to understand. There are many departments of the American Institute which have material to pour into the pot from which fine stories of baking may be drawn forth.

For instance Roscoe H. Shaw, in the nutrition laboratory, has found that if you make a sandwich composed of water-mixed bread it won't make the animal eating it very happy and won't sustain him in health very long. But if you make the sandwich of milk bread and spread it with butter it will make the animal happier and sustain him longer. But if you add a slice of ham it will make him still happier—but not happy enough nor satisfied enough. Nor will it keep him healthy enough. But if to the milk-mixed bread with butter added and a slice of ham in between a slice of lettuce is added, then the animal will be kept healthy and happy and strong indeed.

So that from the laboratory of Prof. Shaw can come a message of what best

to advertise in the form of wheaten foods for the home-maker's menu.

For new days new ways. And there never has been such a day in the baking industry as that which now lies ahead of it. The way to begin it is by bringing an end to the old hocus about advertising. When this was a go-as-you-please enterprise with each manufacturer working for himself alone, the usual way was to call in somebody that didn't seem to be very busy and tell him to write some advertisements. Now writing advertisements is a trade of its own. It is complicated and the objective is to get the advertising read—and its potential work of conversion done. Writing them is easy. Getting them read, and read in such a way as to bring results is another matter. That's where the baker who calls in a real expert and sees that he is fully grounded in the science and art of bread making, forges far ahead of his "guess-so" competitor.

This "Tell the World" day at the Institute will take all the guess work out of the task of telling the baker's story and will codify and reduce to a science the business of getting that task done.

Making It Register

Elmer Cline will, of course, preside. This enterprise is a business of getting into action an idea formulated and advanced by Elmer Cline. What a long study of advertising methods can do for a man is well illustrated by the state of mind in which the present writer, for instance, looks back upon the Christmas cards that came over his desk. Two stand out from the mass—as different and conspicuously successful. Elmer Cline wrote one of the two. Candles and a snow-buried home, with windows alight and shining through spoke its key-note. They were embossed on the envelope. Inside was a letter-sheet topped by three houses in a row. Then there was a little note about the friendliness of life with three houses

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in a row into any one of which Mr. Cline might wish to drop for a congenial evening—if only his friends lived amiably in each. As a greeting it “registered.”

The skill with which Elmer Cline worked up a Christmas card, he has been using for years in working up bakery advertising that “registered its story.” Sometimes it was a full-page advertisement addressed to the city’s bankers and business men. Sometimes it was a picture to be cut out by a child and colored by the child. School teachers who came asking for hundreds of copies to give to the children under their care betokened the way this card “registered.”

Mr. Cline will preside through the two days of the conference and its discussions will all revolve around problems that to him have come to have particular importance.

The other of the two Christmas cards that “registered” so forcibly as an example of skillful card writing was a card sent out by William Matthaehi of Tacoma, Washington. Mr. Matthaehi has made the business of telling the baker’s story a fine art. He has lately perfected a system of letters to housewives written about baking factors that should interest them. His series will be on display for study—and as a model to any baker in attendance to whom it may appeal. The essential spirit of all participating is that they want to contribute to the good of the industry and are not holding back for themselves ideas that may promote the whole cause. They serve in the Roosevelt spirit that “everyone owes something to the industry or profession of which he is a part.”

The Discussion Leaders

The discussion leaders include Lewis F. Bolser, President of American Bakers Association, who will tell what better publicity, better advertising, can mean to the baking industry. Mr. Bolser has been

“telling the story” in addition to producing good products for a long, long time. Just now he faces a problem of public education himself through the elimination of “guess so” methods in another field. It is well known that army officers who just fed their men “food” often half starved them on an abundant diet because it lacked essential factors of nutrition. Just so dogs were half starved on dog biscuits. Mr. Bolser tested the best biscuits that could be built on guess-so knowledge. They killed the dogs that were fed on them in four months. Then he began to build up the biscuit with the newer data of nutrition.

He added germs of oats to wheaten bread and to these he added milk, and presently emerged a dog biscuit that would completely sustain the life of a growing dog and would sustain its young when they were born, and permit the mother amply to suckle her young.

But folks lacked the knowledge to appreciate how defective the older form of food for dogs had been. They lacked the faith in the newer type that would make them glad to pay for health insurance for their pets. He was forced to await a day of greater education, and to temporarily omit the milk. But on the package he printed a notice, “feed a saucer of milk a day, in addition to this food.”

Now if the educational program necessary to the successful sale of a life-sustaining food had been done this compromise would have been unnecessary, for the pet owners will pay much more for that saucer of milk a day than they would if they had been ready to buy it already mixed in with the biscuit.

The same fate awaits the baker who mixes in too rich a supply of milk in his bread, or too abundant a supply of figs or raisins. Trade acceptance means advance, always, and education often precedes the best form of trade acceptance—

the form which means most contentment and satisfaction once it is understood.

Paul Stern's Part

In Milwaukee Paul Stern has had much experience organizing a sales force. He will lead the discussion on the organizing work essential to putting a sales force into the field and making it effective.

At Regan Bros., Minneapolis, Harry Fawcett has had a similar experience—in the teaching of the men who comprise the sales department. He will outline this experience and lead a discussion centered upon such work.

How a sales force may fall down on its end, through lack of co-operation in other departments, is well illustrated by an experience of the W. E. Long organization. Mr. Long planned a "sales drive" in a certain town. But he sent his experts there first—his engineers and production men. He found the loading-out platform all wrong. It took three times as long to load out wagons as was necessary. The bread was often crowded into baskets so that wrappers were torn and loaves crushed. They became "unsaleable"—that is they lost their attractiveness.

Coordination of Effort

Before he undertook that sales drive he had the bakery made ready. An efficient loading-out system was installed, salesmen were sent on their way in reasonable time and by the mere increase in this morale by the evidence of co-operation, he had won his first victory. The bread was made right, first, it was brought to the drivers in good condition, second—then the sales drive was ready, and the directors of it could tell their story confident that the bakery's goods would back them up.

How this co-operation works and can be created will be told by Monte Burns of Omaha.

As Seen in the South

In the South many special problems arise. There is a desire there for "hot breads." Leroy E. Rogers has studied the problem for the American Bakers' Corporation at Atlanta. He will tell his story as the starting point of a discussion upon factors connected with it.

A "Tell the World" Dinner

A "Tell the World" Dinner, to be given by the Dough Club of Chicago, will end the first day's work. This dinner will introduce the Dough Club to the livelier life of the baking world. Its members have been "strutting their stuff" in advance for this evening of entertainment, and it is likely to be an occasion not soon to be forgotten.

An Adman's View

What medium shall the baker use? It all depends on the kind of message he wishes to carry across to the public. A. F. Osborn of Barton, Durstine and Osborn, has made a special study of mediums and their corelationship. He will lead a discussion on this point.

Harry Zinsmaster, Karl Corby and Roy Nafziger will all lead discussions on the salesman's part in a general campaign of advertising.

Many bakers have worked through the medium of the house-to-house canvass. Miss Shough of the W. E. Long Company has had much experience in that line of work and will outline it for the conference. The concluding topic will be on "inter-industrial advertising," led by Dr. L. A. Rumsey of the American Institute.

The conference will probably result in a permanent organization of men interested in "Tell it to the World" topics and service, and this organization will engage in the continuous interchange of ideas as the Bakery Engineers do at this time.

Senator Capper's View

HOW long will politicians assail the baking industry in the name of "farmers' rights"? As long, we predict, as bakers let the farmers remain ignorant of the processes and costs of turning their wheat into baked bread and carrying it to consumers' tables. When farmers took hold of the job of marketing their own oranges they cast aside, after studies by their own G. Harold Powell, a whole school of political dogma that "damned the middleman." Through using these same middlemen Powell pushed orange sales up from 5,000 carloads a year to 60,000 carloads. The average raisin grower today knows ten times as much about baking as the average wheat farmer.

And now comes Senator Capper denouncing bakers along the old lines. It is old stuff, but every baker should know the Capper view. Here it is:

Senator Capper's Statement

Consumers of baker's bread in this country pay in excess of \$300,000 a day, or more than \$100,000,000 a year, for bread they do not get. The "short weight" loaf is responsible for this mulct. While not all bakers practice short weight selling, charging full price for a "short" loaf—a 12 ounce for a 16, a 20 ounce for a 24—evidence is that the practice is general among the large baking corporations where state laws do not prohibit.

Bakeries now produce approximately 60 million loaves a day. At an average price of 8 cents a loaf this production is sold to the consumer for \$4,000,000 a day. If all bakers sold "short weight" the total "gouge" would be \$600,000 a day, but several states have regulatory laws fixing a full weight standard loaf, and practically all the small independent bakers sell full weight. So, it is estimated, the amount the consumer pays for what he doesn't get is about cut in half. This

fixes the total daily "gouge" at approximately \$300,000.

Such uniform regulation as the proposed legislation contemplates can scarce work a hardship upon legitimate profits of the industry. This is rather clearly brought into evidence in the case of the District of Columbia where bread weights and standards have been fixed by Act of Congress. The legislation resulted in a full 16-ounce loaf at equal or less money cost to the bread consumers of the capital. Prior to the enactment of the law, a 12-ounce loaf sold in the District for 10 cents. Now the consumer gets a 16 ounce loaf for the same or less money. It was shown at the House hearing that a Washington baker who sold his product to the public at 8 cents a loaf, had furnished the Navy bread at \$3.69 the hundred weight. The proposed legislation, therefore, can not furnish a defensible reason for an increased price of bread to the consumer.

A suggestion as to the profits of the baking industry may be had in comparison of the returns of that business with the returns the wheat farmer obtains.

One barrel of flour will produce about 285 one-pound loaves of bread. Sold at 8 cents the loaf, a barrel of flour brings the baker \$22.80. About five bushels of wheat are required to make a barrel of flour. At one dollar the bushel—slightly better than the average price of a bushel of wheat to the grower in recent years—the barrel of flour brought the farmer but five dollars. The return is better than four to one in the baker's favor. This is ample margin to cover the baker for his labor and other ingredients used in production of bread and a margin of profit. It should be remembered, too, that the farmer who sold the wheat, sold it under uniform standards and regulations as to grade and quality. Why shouldn't the baker sell his product under like standards?

BAKING TECHNOLOGY

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We Work Together

To win through knowing our markets and developing their full potential possibilities, a higher place for the baking industry in the great family of America's business life.

The Cyclone Cellar

ONE of the questions that bakers are asking each other and themselves today is—"What is the final story and what am I going to do when my present flour purchases have been dissipated?" This prospect should not catch any baker off his guard. Not all can be fortunate enough to at all times "guess" the flour market and in this way protect himself against a necessary advance. But why depend upon this? Located in the plant of every baker, be his organization large or small, is his Cyclone Cellar, and this cellar is nothing more or less than the baker's storeroom of figures which give to him at all times his actual costs. When raw materials and manufacturing costs have advanced and the baker sees his money surplus gradually shrinking it should not be necessary for him to seek the advice of his banker and friends and ask what to do. Rather he should secrete himself in his cyclone cellar of costs and take stock of

himself and his business from figures prepared by him of the actual cost of conducting his business. When these figures tell him he can no longer sell his bread and baked products at his then present prices he should know what to do.

The fear of losing business to their competitors has been the direct cause of driving many bakers to the wall because back of it all they possibly can stand a shrinkage in volume of business if the margin of profit is still there.

Too few bakers look to the men from whom they are borrowing money and buying their supplies as the ones who finally must close their doors because they (the bakers) cannot pay their bills. These are the ones to fear and guard yourself against rather than your competitor.

Therefore, be fair to yourself and the people who are putting confidence in you by taking a look at your cyclone cellar today and seeing if it is in shape. See if you do actually know what it costs you to produce your bread, rolls, cakes, etc., and in this study you must first consider your method of operation and determine whether or not it is your wasteful practices which are causing you to advance the price on your goods before your competitor takes a similar action. But when you have satisfied yourself that you are manufacturing your goods as economically as possible, and when your figures show your materials at these costs are going to cause you to lose money, fear not what your competitor may or may not do, but base your resale price on what you must have to stay in business.

Would it not be well to look to your cyclone cellar? If it is not in order, put it in order and talk and act from the basis of what you must do to preserve your business and do not "guess." What the other fellow does or not do is not necessarily right. Do, yourself, what your figures tell you is necessary. Knowing costs means business under control and if you will keep

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your eye on costs, profits will take care of themselves.

LEWIS F. BOLSER,
President.

A Departure

FOUR years ago a young man of Minneapolis appeared at the doors of the American Institute of Baking, then located in Minneapolis. He asked permission to enroll as one of its first class in baking. He became a pioneer graduate and as one of the first alumni accepted a position in the Institute, as chief of its service work. For three years he has helped bakers to make bad loaves better and good loaves better still. His was the spirit of a romantic prophet who loved to preach better quality as a means to better public satisfaction with bakers' bread. No baker to him was small and no baker was large. He zealously answered every appeal for help and demonstrated what Science can do for the baker at every convention he was allowed to attend. And calls took him afield very often.

The Institute now sees this young man, Otis W. Hall, pass out of its doors to other work. A larger—much larger—offer took him to the Liberty Yeast Corporation where his work will be in service as it was,—the service of helping to build better bread. The Institute, of course, wishes him well. It was honored always by the spirit of his service. One day the whole industry will be shot through this way with men from the schools of the industry, and none will ever go back on the backgrounds through which he grew. Thus the heaven of their influence will always be at work.

Maruki-Go

WHO can tell what effect on the future of the baking industry, an enterprise now launching in Japan will have? M. Mizutani of Osaka, Japan, believes that the rice eating people of the world will soon become, in large part, eaters of white

bread. In Japan he finds the people have already exceeded in numbers the available rice supply. He owns over 30 bakeries in the Orient and he has just completed a tour of the whole world in which he has closely studied every modern baking machine, every trick of modern bakery construction, and every source of wheat flour available to the Japanese market.

A modern bakery, with every device that helps to turn out first class bread for San Franciscans, Londoners, Parisians, New Yorkers, or Chicagoans, will be reared as a first result of this progressive baker's world tour. It may mean much, within a decade, in shifting the dietary habits of a great people.

Our Students

MUCH more intimately, even, than through his study of American baking methods is American bread production to be tied to Mizutani bakery developments in Japan. When the roll was called for the ninth class at the American Institute of Baking, two interesting students arose from overseas. One was a young man from across the Atlantic to the eastward—a London baker's son. The other answered "Mizutani from Japan." And no student went at his tasks more seriously than this Japanese son of Japan's largest baker. When he takes all he learns here home to his native country he may write his name as large in the baking world there as the sons of Dent Harrison did after their return from the Dunwoody Institute to their father's plant at Montreal. After their return Canadian baking was never just the same for they advanced its cause not only in their father's plant but through example in all other parts of Canada. What a former student is doing in Mexico City makes one of the richer romances of our industry. He carries the name of our Institute on every wrapped loaf and even on his trucks.

Knocking Down the Margins

*A Message from Government to Business Telling what
Government expects the Businessman to Do*

By HERBERT HOOVER*

A word of wisdom and also a word of warning is voiced by Herbert Hoover to American business—and to bakers as business men distributing bread over wide areas. Are the bakers going to find the best means or is the Government going to find a means that it considers best, and supplant friendly cooperation and leadership within the baking industry itself by hard-and-fast government regulations? Government is said already to have more government agents abroad subsisting off industry than there are automobiles in America. Old governments were all that way. Business has only had a chance for a few years and the incrustation of inspectorial free boarders on Industry may force American business down to old-world standards. The will to lead is what Hoover here calls for within each industry to take "the talking points" away from the other tendency.

THE outstanding problem of our distribution system can be summarized in one question.

Can we reduce the margin between our farmer and manufacturing producers on one side, and our consumers on the other?

I am convinced that we can. I believe that it can be done without reduction of wages or legitimate profits. I believe that in doing so we can make the greatest contribution to the improvement of the positions of our farmers and that we can make a contribution to lowered cost of living. I believe it can be done by voluntary cooperation in industry and commerce without governmental regulation. It can be expedited by an extension of the friendly assistance of the government agencies in organization and information. **These possibilities lie in the elimination of waste.**

In speaking of waste, I do not mean waste in the sense of willful waste, but economic waste, which is the natural outgrowth of a competitive system. I do not mean the waste that any single individual can correct by his own initiative, but the waste that can only find remedy

in collective action. Nor are the wastes to which I refer to be corrected by any extension of the Ten Commandments, or by any legislative extension thereof. **You cannot catch an economic force with a policeman.**

The kinds of waste that cause costly losses may be catalogued as follows:

1. Waste from the speculation, relaxation of effort and extravagance of booms with the infinite waste from unemployment and bankruptcy which comes with the inevitable slump.
2. Wastes from excessive seasonal character of production and distribution.
3. Waste caused through lack of information as to national stocks, of production and consumption with its attendant risk and speculation.
4. Waste from lack of standards of quality and grades.
5. Waste from unnecessary multiplication of terms, sizes, varieties.
6. Waste from the lack of uniformity of business practices in terms and documents, with resultant misunderstandings, frauds and disputes.
7. Wastes due to deterioration of commodities.

* In an address before the National Distribution Conference at the U. S. Chamber of Commerce Bldg., Washington, D. C.

8. Waste due to inadequate transportation and terminals, to inefficient loading and shipping and unnecessary haulage.

9. Waste due to disorderly marketing, particularly of perishables, with its attendant gluts and famines.

10. Waste due to too many links in the distribution chain and too many chains in the system.

11. Waste due to bad credits.

12. Waste due to destructive competition of people who are in fact exhausting their capital through little understanding of the fundamentals of business in which they are engaged.

13. Waste due to enormous expenditure of effort and money in advertising and sales promotion effort, without adequate basic information on which to base sales promotion.

14. Waste due to unfair practices of a small minority.

15. A multitude of wastes in use of materials, in unnecessary fire destruction, in traffic accidents and many other directions.

These wastes are not the small change of industry and commerce. There is scarcely a step in this accomplishment of squeezing out waste which does not interpret itself in millions of dollars of annual saving.

Wastes Come High

As these wastes are enumerated they may seem to be of main interest to manufacturers and distributors. But in the end the public pays the bill. It is either charged into the consumer's price of goods at one end, or subtracted from the wages of producers of raw materials, such as miners and farmers, at the other end.

The work of the Department during the last three years has demonstrated that there is a vast importance to these wastes. I am disposed to agree with a recent report of the Engineering Council that they

amount in many lines to 25 or 30 per cent of the cost paid by the consumer or producer of raw materials. They cannot all be corrected and where progress can be made it is only through toilsome building step by step in a thousand places, and always and only through the co-operation of well disposed trade and industry, and through a wider understanding of the problems involved, and of the co-ordination of effort necessary to secure results. This is not emergency work as new wastes will constantly arise and permanent trade organizations, are needed in each industry for their elimination.

There has been a vast amount of research into our distribution problems, and many publications on them during the last few years. Many have been largely directed toward discovery and exposure of some real or supposed great crime. Others have searched for a miracle panacea that would overnight effect enormous cuts in the great margin between our farmers and our consumers, or between the manufacturers and their clientele. No such panacea has been found simply because there is none. There are no short cuts to progress.

Nor are we here to worry on behalf of the lady who wishes to order a cake of yeast by telephone to be delivered by a gold colored automobile. You and I are interested in this problem solely for a better service to our producers and consumers of the primary necessities and ordinary comforts of life.

The reduction of waste means that a considerable part of our population who are busily employed in this unnecessary motion can be directed towards the production of other commodities and thus their addition to the national standard of living; it means a lowering in cost of living; or it means more goods for the same money. To our workers it means less labor, more time for recreation, and no

attack upon wage levels; to our farmers it means an increased proportion of the consumers' dollar as the returns which he receives from his produce are subject to the deductions of the cost of marketing. If we decrease these costs by the elimination of the waste in them we increase the return to him. To him it also means enlarged domestic consumption. Moreover, he participates also in the benefits as a consumer. To our industrial and commercial men there is an increase in stability in business and a sounder foundation under our entire business fabric. The elimination of waste is a total asset. It has no liabilities.

Statistics

I wish to again emphasize that I do not believe the remedy lies in legislation except insofar as the government may stimulate and assist our citizens to better organization for these purposes and may furnish them with fundamental information which assists in the whole question.

These are the wastes which have grown naturally into our economic system. They can only be corrected by co-operative action. Such action can be built up first by investigation and information, second by conference of the producer and consumer in his various representatives and agreement to abide by the principles laid down.

Nor am I talking about abrogating the Sherman Act. I have no patience with those who deliberately try to confuse these efforts at co-operation in waste elimination with price fixing and restraint of trade. Any intelligent person who has the patience to read and think these problems through and the methods we have developed for their correction will find these efforts to be in the interest of public welfare, and free from trade restraint. They are in fact the foundations of real competition.

In order that I may make myself more clear I propose to discuss both the theory and the practice attained in the work of the Department of Commerce as a sort of economic laboratory during the last three years.

It is a truism to say that no individual business enterprise could succeed or be conducted without waste if it does not know accurately its stocks, the volume of output or sales, the rate of stock turnover, or its orders, or the prices, assets and liabilities and the relation of these to previous periods. Neither can the business of a trade, as a whole, or the nation itself, function efficiently unless it knows these very things.

Statistics are a counterpoise to "psychology" in business—an anchor of basic facts to tie to.

The best protection against booms is that every business man shall have the information so that he may realize from the shifts in credit, from the movements in stocks, of production and consumption, that the economic balance wheel is moving too fast and if every man then safeguards against danger disaster never comes.

So the first and foremost thing is to have such facts broadcasted so as to give to every man that sound basis upon which his own judgment can react. Solemn statistics are the greatest preventative of speculation and profiteering ever invented.

Facts for Guidance

The government can do much in collection and distribution of statistical information. Indeed the Department of Commerce has greatly improved and expanded these services in the last three years. No other nation provides so complete a service today. It needs still greater improvement. However, a considerable part of our statistical service can be bet-

ter provided by the different trades themselves than by the government.

Right here some tormentors of progress will rise to say that the collection of statistics by the trades may be used to flim-flam the public. They can be so used. They have been so used. Likewise automobiles have been used for purposes of bootlegging.

There is a phase of statistical service that has not been fully studied or fully explored. We are almost wholly lacking in the basic data as to distribution. We know our production in the most important lines of activity. We know a great deal about stocks of commodities in the hands of producers. We know very little as to stocks in the hands of consumers, the area of distribution in any commodity. If we had a census of distribution I am convinced that this information would automatically eliminate a great amount of waste in the whole distribution machinery. High pressure selling and marketing expenditure in unprofitable areas is a national waste. We do not know where these areas are today.

The Standards' Basis

Next to statistics as a power to eliminate waste comes standards.

In order to have standards we must have methods of test by which the fidelity to these standards can be determined. We must have a definition of terms which we apply to these standards. We must have a formulation of specifications to express these terms. Here we enter upon involved problems of chemistry and physics and trade practice and public need and legal implications of the widest character.

The foundation of proper standards is scientific investigation and then co-operation of the representatives of the producer, the distributor, and consumer in bringing them to practical workday conditions.

Trade Ethics

There is a problem in waste which revolves in the field of trade ethics. Unfair competition of course is waste as it imposes wasteful processes and wasteful and fraudulent practices on other members of the trade and the public. It is prohibited by law. The law is, however, very obscure in determination of what is an unfair practice.

In the field of business ethics we have seen a great advance in the last two decades and chiefly due to the effort of the better trade associations. This brings up an interesting question as to the use which might be made of trade opinion and determination of what is unfair competition. Our English common law was a crystallization into law of trade practices which anteceded it many centuries but with their crystallization into law, and with the development of the industrial era with its multitude of new methods of violating the Ten Commandments, trade opinion and custom affecting probity and fairness has had but little representation in the formulation of rules. It would seem worth considering that the voices of the large majority of a given trade might be given weight in the determination of what is unfair. It might lead to a degree of self-government of industrial and trade morals which would free us from much regulation.

Wasteful Competition

There are processes of wasteful competition which are entirely outside of legal interpretation of unfair competition. They rise chiefly from ignorance of efficient methods of conducting business and they impregnate our whole system of distribution from top to bottom.

Few people who have examined our distributive methods will deny that a minor element of our retail traders are so ignorant of the primus of accounting

that they unconsciously deplete their capital to the point of exhaustion before they cease operations. It is also generally apparent that such people are dangerous competitors, who undermine the whole scheme of fair competition and thus do far more damage than their numbers might imply. These men are sure to result eventually in failures with a consequent waste of capital, which is reflected in higher costs to the consumer. It is not in the interest of the public to have so many units in any trade that they can not all operate efficiently at a living wage; it means a vast duplication and in the end imposes charges and waste on the ultimate purchaser.

The only remedy that I know is education. For some time the Department of Commerce has been attacking this problem with the aim of spreading among this section of the business public a better knowledge of what constitutes efficient trade practices. Comprehensive plans are being laid and followed by the Department to collect and disseminate knowledge of best merchandizing practices in many trades.

Waste in Transportation

Expedient, regular transportation is a fundamental necessity. Any stricture or clog brings untold wastes in distribution. A coal car shortage not alone raises the price of coal, but it dislocates production and distribution right and left. The penalties of any transportation failure are far greater than the whole freight charge on the commodity in motion. Due to the energies of our railway managers we have now emerged from this particular chaos of the war. We have, however, a problem in freight terminals which has not grown in tune with our cities. There are cities where the terminal distribution costs on many commodities, particularly perishables, are larger than some long haul rates. The problem is by no means

one that can be entirely solved by the railways. There are wastes in transportation for which the shipper is responsible—wastes of partial car loading, wastes of long routing and cross haul, wastes of bad packing, wastes in reconsignment. They probably aggregate a half billion a year over what we could do if we did it better. The voluntary regional committees of shippers and railway operatives now functioning in these fields are bringing much economy.

Duplication of Distribution Facilities

Obviously one of the greatest wastes in our whole distribution system is the unnecessary number of links in the distribution chain and the excessive number of chains. This is, however, the most intangible, imponderable problem in the whole gamut of distribution wastes.

I do not think anyone will deny that we have more retail and wholesale establishments than we need in all sorts of directions and that, therefore, there is imposed upon the distribution system a vastly larger overhead than is necessary. There is no way of preventing a man going into business if he wants to, nor would it be desirable if we were to limit the number of people who enter into any profession or occupation we would set social currents going that would be the destruction of the whole system.

Other Wastes

Every time we set up a standard, every time we set up a better understanding of accounting and principles of business, we will, in ultimate effect, diminish the excessive number of units by bringing competition onto the more legitimate foundations of intelligent action and a result will tend to diminish this excessive membership in the trades with their wasteful overhead charged against the consumer.

It is not my purpose to go into those fields of improvement in power, water-

(Continued on Page 28)

Vitamins and Teeth and Bones

*The Latest Views of Scientists on Accessory Food Factors in the Diet**

IT has long been believed that normal bone and teeth formation depended upon the adequacy of calcium or lime salts in the diet. The fact that bone and tooth structure is high in calcium content, coupled with the observation that the bones of rachitic animals are markedly deficient in lime and that diets high in starch content and low in calcium apparently induce rachitic conditions and badly formed and carious teeth, has perhaps naturally led to the conclusion that a diet deficient in calcium is to be avoided.

The dental profession within the past few months has in its conventions and in widely copied interviews stressed the need for a wider knowledge of the principles of nutrition upon which to build a more perfect toothed people.

By a process of a priori reasoning many dentists and pediatricians have reached the conclusion that the modern diet, rich as it is in refined foods, such as sugar, highly purified cereals, skinless fruits and vegetables, is the chief contributing factor to the abnormal conditions known as deficiency diseases. And, as a remedy they propose a return to the use of the so-called natural foods, the whole grains, unrefined sugars and coarse textured vegetables.

It is evident, however, as we must conclude after studying the latest scientific works on the subject, that the calcium content of food is not the all important factor in normal bone or tooth formation.

* Abstracted from "Report on the Present State of Knowledge of Accessory Food Factors (Vitamins)" compiled by a committee appointed jointly by the Lister Institute and Medical Research Council, 1924.

The report quotes at length the classic work of M. Mellanby, referring to her early studies in 1918, and to later investigations made in 1920, '21 and '23. The early work of M. Mellanby showed that the formation and calcification of the teeth and jaws were greatly influenced by the diet eaten during their development and that a fat-soluble vitamin had a potent effect on the calcification of growing teeth.

It was later noted that puppies fed on diets deficient in fat-soluble vitamins during the time of the development of permanent teeth had defective jaws and teeth. However, puppies given the same foods to which had been added a sufficient amount of fat-soluble vitamins had normal jaws and well calcified alveolar processes and teeth.

In brief, the results noted were:

1. Diminishing the calcium in the food as well as the fat-soluble vitamins produced very badly formed teeth.
2. Diminishing the calcium while the fat-soluble vitamins were kept high reduced calcification but produced well formed dentine.
3. Diminishing the fat-soluble vitamins and increasing the calcium in the food produced badly formed teeth.
4. Diminishing the fat-soluble vitamins and increasing the cereal intake gave worse formed jaws and teeth.
5. Different cereals gave different results. Oatmeal was the worst cereal examined while white flour and rice were the best.

The addition of 20 per cent of wheat germ to white flour seriously injured tooth formation when the fat-soluble vitamins

were deficient. When oatmeal was the cereal component of a diet deficient in fat-soluble vitamins the teeth were extraordinarily bad. On the other hand, fat-soluble vitamins fed in sufficient amounts neutralize the harmful effects of oatmeal just as they overcome to a larger extent a deficiency of calcium in the diet.

The logical conclusion to be reached from a study of this work is:

(1) That calcium rich foods do not in themselves contain the qualities necessary for proper bone and tooth formation, but that an adequate amount of fat-soluble vitamins is essential to proper metabolism.

(2) That foods heretofore thought to be deficient in lime content, such as white flour, rice, etc., will when fed with an adequate amount of fat-soluble vitamins produce normal bone and tooth structure.

(3) That heretofore highly recommended foods, such as oatmeal and wheat germ, if used in a diet deficient in fat-soluble vitamins, produce very bad teeth.

Answering the criticism of dentists directed against M. Mellanby's conclusions that the correct feeding of mothers during the prenatal period and of infants during the development of the teeth will result in the production of perfectly calcified, evenly arranged teeth, resistant to caries, the author points out that the observations of dentists that but 3 per cent of children have hypoplastic or badly formed deciduous teeth while 90 per cent have teeth ultimately affected by caries, were the result of macroscopic examinations. Through microscopical studies reported in 1923, M. Mellanby showed that a macroscopical study of teeth structure was misleading and that 92.2 per cent of more than 300 teeth examined showed a direct relationship between structure and caries. All the experimental work lately reported shows that the development of

well formed teeth, resistant to caries, depends upon diets rich in fat-soluble vitamins, such as cod liver oil, milk and eggs, and not, as has been so generally held, on the use of whole grain cereals, oatmeal and wheat germ.

Many clinicians have thought rickets in children to be often due to excessive carbohydrates in the diet. Mellanby's original observations apparently confirmed this idea but further experiments reported in 1922 made it clear that the carbohydrate intake, although of importance, was not the only contributing factor. The adequacy of the anti-rachitic vitamins is most important.

In the study of the relationship of cereals used in diets with an inadequate anti-rachitic factor to rickets in puppies, it was shown that oatmeal was most potentially ricket producing, the disease developing much more rapidly on oatmeal than on whole wheat meal or white flour. And as between whole wheat and white flour, the action was slightly worse with the unpurified product. The addition of 20 per cent of commercial wheat germ to white flour produced a slightly more severe degree of rickets.

While general conclusions as to the relative values of whole wheat and white flour in the development of bone and tooth structure should not be drawn at this time, from the results of the latest studies as reported by the Medical Research Council it is evident that the criticism of white flour and bread, because of its lowered calcium content, is unwarranted by the facts and that the limiting factor in the diet of children is not calcium but fat-soluble and anti-rachitic vitamins.

References

- M. Mellanby (1918). *Lancet*, Lond., ii. 767.
(1920). *Dental Record*, 40, 65.
(1921). *Brit. Jour. Dental Sc.*, 64, 80.
(1923). *Brit. Dental J.*, 44, 1.
(1923). *Proc. Roy. Soc. Med.*, 16, 74.

First Get the Facts

IN our efforts to increase the consumption of baked products we find in our path a number of obstacles which, trivial and fantastic though they may be, do discourage the baker and make him question sometimes the advisability of engaging in controversies concerning the place of bread in the diet. Fortunately for the industry, it is traveling on a road as solidly built as the Appian Way. There are no quicksands under the road bed and every obstacle as it is approached very quickly falls to pieces.

We have feared, for instance, the white bread boggy. Every time a doctor, or dietitian, or self-appointed contributor to the vox populi columns, proclaimed the virtues of whole wheat bread, we, and our friends the millers who were forcing us to bake their "denatured" product, hunted the cyclone cellar and stayed under cover until the loud noise and gusty wind had passed on.

Of course, it was foolish to hide. But it was natural. Business dreads criticism, especially stupid criticism. For the weaker the argument the louder the oratory. The situation has changed. A letter sent me a few days ago by Dr. Arthur J. Cramp, the Director of the Bureau of Investigation and Propaganda Department of the Journal of the American Medical Association, throws a clear and vivid light on this old subject. Dr. Cramp says:

"I have wondered recently whether you have ever thought of suggesting to the organized bakers of the country that there is very real need for an educational campaign on the part of the modern baker directed first toward the medical profession and, second, toward the general public on the subject of white bread.

"As you probably know, the medical profession has a very poor opinion of ordinary white bread and loses no oppor-

tunity of depreciating it when dietetic questions are raised. The food faddists and fakers have, of course, been most virulent against white bread. But it is an unfortunate fact that the medical profession itself has rather taken the attitude that there was a certain degree of soundness in the denunciation against this staple article of diet and, instead of attempting to correct the impression, has let it stand.

"I believe the baking industry would do itself a service if it undertook to carry a campaign directed first, to the medical profession and later, if necessary, to the public direct, on the facts regarding white bread, as made today by the more progressive and far-sighted members of the baking industry."

Fortunately the baking industry is now in a position to carry on the campaign Dr. Cramp has suggested and in which we shall have the efficient help of the Bureau of Investigation and Propaganda of the American Medical Association.

White bread has suffered not only at the hands of physicians who have failed to appreciate the increased nutritive value of the modern loaf. The dental profession has been equally careless in criticising white bread. But recently a department of dental health education has been organized by the American Dental Association for the purpose of educating the public to the use of a diet which will furnish the necessary lime salts and vitamins to build tooth and bone structure during the prenatal and pre-school period, and through co-operation with the public press and magazines to educate the masses in dental health and so to carry on a philanthropic work that will build better bones, teeth and health for the American people.

In the development of this campaign the baker may well take an important part for it is his contribution to the

dietary which furnishes the basic material around which the normal diet is built. No baker will take any exception to the purpose of physicians and dentists to build a stronger, finer race. He will contribute his loaf made with milk to that end and he will hope that in the development of all educational campaigns, the arguments used and evidence presented in support of any contention that the dietary should be changed will be founded on fact.

Dr. Mendel's Book

A new book by Dr. Lafayette B. Mendel, entitled "Nutrition, The Chemistry of Life," closes with this significant statement:

"The science of nutrition is in the midst of a continual evolution of facts and developments of truth. For the present, therefore, we should 'first get the facts.'"

Any campaign for better nutrition which recognizes the fact that the science is constantly changing and that our ideas of food and its role in nutrition which we learned even a few years ago are not true today, will be helpful. Any campaign which does not take cognizance of the latest discoveries in the field of nutrition will fail of its purpose.

As an illustration of the danger of misstating nutrition facts, one has only to recall the frequent references the newspapers have recently made to statements before dental societies as to the iniquitous character of bread. Shortly after the annual convention of the American Dental Association at Dallas, Texas, a series of extraordinary statements made at that convention were broadcast. The reader was led to believe that unless the American people ate more whole grain breads, more vegetables cooked to retain the lime salts, more whole milk and more natural sweets within the next two or three generations we will be a nation of weaklings so far as bone and teeth are concerned.

A little later the State Dental Society of Ohio held its convention and the newspapers in reporting the addresses made the authors say that bread "ruins teeth" and that it is "our most injurious food."

Scores of clippings from every portion of the country came in to the Institute, the senders asking for the truth and urging that the authors of the quoted statements be called sharply to account for their perversion of the facts. With the first notice of these published attacks on bread, letters went out to the authors.

The Texas essayist not only furnished the Institute with a synopsis of his address, which upon careful reading proved to be logical, unbiased and free from prejudice against white bread, but he wrote us saying, "The reference to bread was only one incident in the discussion of my subject, the Education of the Public in Matters of General Dentistry. I am as anxious as you are that the public know the truth about bread's containing the necessary lime salts for tooth and bone formation and I realize also that half-truths do more harm than good."

A Dental Correction

In addressing the President of the Ohio State Dental Society, whom the newspaper quotations made to say most extraordinary things about bread, the Institute wrote:

"American Institute of Baking takes no exception to the fact that teeth are built up with lime and that the growing child must have an ample supply of all the mineral constituents essential to bone and body building. Nor is the baker in any way opposed to the consumption of whole wheat bread, although this is too frequently assumed to be the case by those who fail to recognize the fact that the baker is simply a manufacturer who makes what his customers want and who

has very little indeed to do with the direction of their nutritional demands.

"In one of the clippings reference is made to the 'good old days' when every man plowed, sowed, reaped and prepared the food for his family and the conclusion is somehow reached that in those days we were physically better off than today. Do you think this is a fact? The types of foods eaten 5,000, 500 or even 50 years ago were different, of course, from those foods which come to our table now, and in so far as tooth structure is concerned, perhaps better adapted for building up massive and healthy teeth. But, can you anywhere in the literature find any evidence that the children and adults of other days were better nourished, more efficient and lived longer and happier lives than those of today? If there is anything fundamentally wrong in our modern methods of living, we owe it to posterity to determine the facts and correct the practices which are responsible."

Loose Press Work

In reply to our communication we have received a letter from the reputed author of the misstatements which is so illuminating that it may well be quoted, not only in fairness to the dental profession and to the baker, but because it so aptly illustrates the ease with which facts as presented at scientific meetings become the wildest fiction when told by the untrained reporter. In his letter the author says in part:

"I will gladly furnish my address if you still so desire, although it contains no mention of diet nor nutrition, and was purposely made without mention of scientific fact of any kind, but was rather an intimate talk of family affairs of absolutely no interest to any one outside our own small group. What purports to be an address was the result of a friendly

conversation not intended for publication; the dominant idea of which was the importance of prenatal diet, and the apparent conflict of ideas between the dental and medical professions, the medical profession thinking of ease of child-birth and the dentist naturally thinking of the prefixing of teeth.

"Under the circumstances the language used was perhaps not as carefully selected as it would have been under other conditions, but in the light of quotations seems to have been much over the head of an inexperienced reporter, who was more intent on getting a sensational story than facts, and in using my position to give an appearance of authority for such a story. Your disgust at such quotations and headlines can only be equaled by my own chagrin at such comparisons as have been made. I trust that I have not yet reached the age when I have to revert to the 'good old days' to find all that is good in life, and still old enough to know that the habits of the world cannot be changed in a day by a theorist unsupported by facts."

No further comment seems necessary other than to suggest that no matter how fully both dentists and doctors understand the science of nutrition, their discussions of the subject are always subject to misinterpretation and their simplest statements to exaggeration. The only way to remedy the situation is to tell the story of bread so fully and yet so simply that every one can understand it.

—H. E. Barnard.

Have you a problem of delivery by gas trucks on long hauls? If so Public Roads, a journal of Highway Research, should be of interest to you. Its number 5 of Volume 5 discusses highway transportation as it affects the hauling of milk. The copy can be obtained by writing to the U. S. Department of Agriculture.

Weight Losses in Wrapping

How Different Classes of Paper Act Over Various Periods of Time

By C. B. MORISON

Of the American Institute of Baking

THE sanitary and hygienic side of the bread wrapping problem has been the subject of considerable study by the bacteriologist and public health workers and it is now generally recognized that suitable protective coverings have a high degree of importance, not only for the sanitary control of bread, but for other foods.

It is not our intention to discuss this phase of bread wrapping further, but to present briefly some of the results of our experiments on the losses in weight of bread wrapped in dry waxed, self-sealing, waxed on one side, and ventilating stripe papers, over three time periods of twenty-four hours, forty-eight hours, and seventy-two hours, respectively.

The samples of wrapping paper used in these experiments were obtained through the co-operation of several manufacturers of this material and may be described as follows:

(1) Dry waxed: These papers are impregnated with sufficient paraffin to saturate the fibre, but all adhering and superfluous paraffin is removed from both surfaces, so that there is an absence of any appreciable waxy or greasy sensation to the touch like that commonly associated with the so-called self-sealing papers.

(2) One side waxed: These papers are coated with paraffin on one side only.

(3) Self-sealing: These papers are thoroughly saturated with paraffin for the purpose of making them impervious to moisture, and in addition a sufficient amount of paraffin is present so that the ends of the sheet may be sealed by heat

with the formation of a tight and satisfactory union.

(4) Ventilated stripe papers: These are similar to a full waxed paper, but a stripe of unwaxed paper extends across the sheet. The width, form and number of these unwaxed stripes and the proportion of the waxed to the unwaxed area varied considerably in the samples of these papers.

The weights of the wrapping paper used in the experiments varied as indicated in the data assembled in the tables. Most manufacturers base the weights of wrapping paper on the standard ream of 480 sheets, size, 24 inches wide, and 36 inches long; for example, if the paper is referred to as 28 lbs. weight, this means that it weighed 28 lbs. to the ream.

It is well known in the trade that the amount of paraffin carried by the various paper stocks varies with the different grades and the purposes for which they are intended. The manufacturers' statements and claims as to the amount of the paraffin and the quality of the paper can be readily checked up in the laboratory by the extraction of a known area weight of the sample with a suitable volatile solvent, such as ethyl ether, or low boiling point, petroleum ether. After the extraction of the paraffin is completed, the solvent is evaporated and the resulting paraffin residue dried and weighed. The percentage of paraffin present is then obtained by a simple calculation on the basis of the original area weight.

The melting point and quality of the paraffin may be determined on the residue, and the quality of the original paper stock

ascertained by the usual methods of paper testing if suitable apparatus for this purpose is available.

The mechanical testing of wrapping paper in order to determine its suitability for use on the wrapping machines is best done by practical shop tests.

The storing of wrapping paper is obviously associated with proper temperature conditions and especially in connection with the self-sealing papers, it is desirable that the paper be stored in a cool place.

The bread used in the experiments was made from a straight dough mixed from a short patent flour with an absorption of 60 per cent, the mix contained 3 per cent of whole milk solids in the form of dried milk powder, and usual amounts of yeast, salt, malt extract, shortening and commercial yeast food. Mixing, fermentation, and baking conditions were normal and require no comment here. The bread was a one pound round top panned loaf and was allowed to cool one hour before wrapping, except in the case of the ventilating stripe papers. In these experiments the bread was wrapped immediately after unloading from the oven.

The general procedure was as follows:

Ten loaves of the bread were weighed

the air. The bread rack was located in a small room supplied with a thermometer and hygrometer, but as there were no adequate facilities available for the accurate control and regulation of the temperature and the humidity of the room, the observations for temperature and humidity reported are but averages of observations regularly taken over the period of the experiments.

The wrapped bread was weighed at the end of twenty-four, forty-eight, and seventy-two hour periods respectively, and the loss in weight at each period calculated in terms of per cent on the original weight of the unwrapped bread.

As a control and for the purpose of comparison, three loaves of unwrapped bread for each series of experiments were exposed on the rack and the losses in weight determined at the end of each period.

Table I shows the losses in weight of the bread in five different samples of dry waxed paper. The losses reported are the average of ten weighings.

The average losses of the unwrapped bread exposed at the same time was 5.86% for 24 hours, 9.65% for 48 hours and 12.86% for 72 hours. The average temperature of the room recorded was

Table I.—Average Losses in Weight with Dry Waxed Paper. (Average of Ten Weighings)

No.	Class of Paper	Weight of Paper	Weight of Bread 1 hr. after baking	% Loss in Weight after		
				24 hrs.	48 hrs.	72 hrs.
236	Dry Wax	21 lbs.	16.4 oz.	3.14	7.28	9.53
114	Dry Wax	25 lbs.	16.8 oz.	0.95	1.89	3.40
263	Dry Wax	25 lbs.	16.2 oz.	1.53	3.33	4.80
124	Dry Wax	28 lbs.	16.7 oz.	1.53	2.04	3.60
121	Dry Wax	29 lbs.	16.7 oz.	0.32	1.17	2.43

one hour after baking and then wrapped. Immediately after wrapping the loaves were placed on a metal bread rack, with the precaution of leaving a uniform space between each loaf for the circulation of

68° F. and the average humidity 46.

Table II shows the losses in weight of the bread wrapped in two samples of paper waxed on only one side.

Table II.—Average Losses in Weight with Paper Waxed on One Side. (Average of Ten Weighings)

No.	Class of Paper	Weight of Paper	Weight of Bread 1 hr. after baking	% Loss in Weight after		
				24 hrs.	48 hrs.	72 hrs.
271	Waxed one side	21-22 lbs.	17.0 oz.	3.74	6.85	9.65
266	Waxed one side	24-26 lbs.	17.0 oz.	1.55	3.78	7.83

The average losses of the unwrapped bread exposed at the same time was 6.80% for 24 hours, 10.02% for 48 hours and 13.14% for 72 hours.

The average temperature of the room was 75° F. and the average humidity 48.

Table III shows the losses in weight for eight samples of the self-sealing paper.

sterile when it leaves the factory, according to Prescott and associates, and the bread was cooled under conditions free from gross contamination, this result is not surprising, although in some cases condensed moisture was observed at the surface of the paper directly in contact with the bread.

Table III.—Losses in Weight with Self Sealing Paper. (Average of Ten Weighings)

No.	Class of Paper	Weight of Paper	Weight of Bread 1 hr. after baking	% Loss in Weight after		
				24 hrs.	48 hrs.	72 hrs.
237	Self sealing	28 lbs.	16.9 oz.	0.39	0.94	2.10
273	Self sealing	28 lbs.	16.7 oz.	0.48	1.65	2.50
320	Self sealing	28 lbs.	17.4 oz.	1.01	2.18	3.27
264	Self sealing	28 lbs.	16.8 oz.	1.22	2.28	3.40
272	Self sealing	28 lbs.	16.7 oz.	0.38	1.04	2.14
343	Self sealing	28 lbs.	16.9 oz.	0.22	0.80	1.50
245	Self sealing	30 lbs.	16.8 oz.	0.21	0.68	1.40
123	Self sealing	35 lbs.	16.7 oz.	0.16	0.60	1.01

The losses with this class of paper are in general much lower than for the dry waxed or the waxed on one side only. The losses shown by the 28 lb. paper compare very favorably with the heavier paper of 30 and 35 lbs. and there does not appear to be any great advantage secured by using the heavier paper.

The unwrapped bread showed losses of 6.9% for 24 hours, 10.2% at 48 hours, and 12.90% at 72 hours during this series of experiments. The average temperature of the room was 75° F. and the average humidity 48.

The wrapping paper was removed at the end of 72 hours after the final weighing and the bread examined for mold, but with negative results.

Since wrapping paper is practically

The condition of the bread was fairly satisfactory at the end of the 72 hour period and appeared to be free from abnormal flavor or taste in the opinion of several judges. The unwrapped bread in comparison was hard, dry and unpalatable.

The losses in weight shown by the bread which was wrapped in the various types of ventilating stripe paper are not comparable to the losses indicated as above, for the reason that the bread in the experiment with this class of paper was wrapped immediately on unloading from the oven. A total of twenty-eight samples was tested and the losses showed considerable differences among the various samples.

Table IV shows the minimum and maximum losses, and the average losses in weight at the three periods.

Table IV.—Ventilating Stripe Papers. (28 Samples)

Average Weight of Bread	Loss after 24 hours		48 hours		72 hours	
	Max.	Min.	Max.	Min.	Max.	Min.
16.6 oz.	3.70%	0.85%	7.05%	1.05%	8.85%	2.81%
Average		1.90%		3.62%		5.12%

The losses shown by the unwrapped bread during this series of experiments was 7.27% for 24 hours, 10.07% for 48 hours, and 12.53% for 72 hours. The

average room temperature was 78° F. and the humidity 48.

No mold growth was observed at 72 hours when the wrapping was removed.

The Longevity Contest

To the Editor of the Washington Post:

I was much interested in the article which appeared in the Post, edition of the 17th instant, relative to the one hundred and fiftieth birthday of Zoro Agha, the oldest man in the world.

As I am a candidate for honor in this line I naturally read with much interest the method by which Mr. Agha says he has kept himself alive. In the first place, his name is most fortunate. The word "Zo" is the Greek word for life; zoology is the science of animal life. It was a happy life, therefore, when they put the "Zo" in Zoro. And perhaps someone was equally fortunate when they put the "ha" in Agha.

I am wondering if Zoro realized that he should have eaten himself into the grave some hundred odd years ago? He states that he has eaten 8 pounds of bread per day practically all his life. The total number of calories in a pound of bread is about 1,220. Mr. Agha therefore consumed 9,760 calories of bread per day. In addition to this he stuffs himself with raisins and fresh figs, and all the honey and raw sugar he can get. This must amount to at least 9,000 calories more, so

that his intake amounts to 18,000 calories per day. His moderation in the number of wives he has had seems to have been counteracted by his indulgence in the largest daily ration which has ever been my good fortune to come across. Of course, I am not throwing any suspicion of incredibility on a newspaper article. According to all the modern principles of nutrition it is almost a miracle that Mr. Agha did not die of over eating long before his 50th birthday. Had he been rich enough to buy as much food as he could eat he would have made Gargantua look like a piker. I take off my hat to Zoro Agha. I eat only about 4 or 5 ounces of bread a day, and only a very moderate amount of raisins, fresh figs, honey and brown sugar. In the matter of wives also I have been much more moderate than Zoro Agha!

—H. W. Wiley.

My son, Wesley R. Parker, took a course at your Institute and I believe it has been of distinct value to him in his work; it accounts for his recent promotion.

—Fred C. W. Parker,
Secretary Kiwanis International.

Milk for Use in Bread

How It Is Prepared In Evaporated Form by New and Growing Industry

By META H. GIVEN

Director of Home Economics, Evaporated Milk Association

Important always to the bread manufacturer are the new industries that are springing up in the wake of his demands. In universities, such as Columbia University, the Home Economics departments are urging the use of more milk in bread. Their leaders, such as Dr. Eddy of Columbia base their appeals to the public to eat milk-mixed bread on the grounds that the people have a settled preference for white bread and that milk solids enrich the carbo-hydrates and proteins of white bread with mineral salts that are an important insurance against bow-legs, poor teeth and other nutritional deficiency results in growing children. The milk problem looks different to many different people according to the angle of their approach to it. How it looks to a Home Economics chief of a milk association is told here, this article being one of a long series in which many different phases of the milk-for-bread problem have been discussed. Other articles will follow. Miss Given, the writer, had extensive teaching experience before becoming associated with food production.

WHEN the food chemist and the home economist first began to tell us about the composition and nutritive value of foods, they listed bread as one of our greatest sources of energy and as a fairly good source of growth and repair material. They also pointed out the deficiencies of bread and suggested how these could be supplied by the addition of milk.

When food value and flavor came to be the main criteria for quality, then there was a further demand for raw materials to have a known food value and a dependability in purity, cleanliness, and freshness. Milk differs from some other food ingredients in that its qualities are not so stable or so easily estimated. The composition of milk varies considerably. The range in fats is from 3 to 4 per cent and in solids from 11 to 12½ per cent. Qualities such as freshness and purity depend on the care given the milk. Being easily contaminated by bacteria, milk may lose much of its food value and may contribute odors and flavors to bread that impair its value. Therefore, if the baker uses milk of variable composition and

quality, he can only guess what the results will be.

That good, reliable milk more than any other ingredient improves the food value, the flavor, color and keeping qualities of the "staff of life," is generally accepted by all bakers. Then, why shouldn't a constituent merit more of this consideration?

Evaporated milk is not a substitute—it is milk itself, which has about sixty per cent of its water eliminated by evaporation. Nothing is added and nothing is subtracted except the water. It is often confused with condensed milk, an entirely different product. In making condensed milk, there is sufficient cane sugar added to the milk to preserve it. It is then evaporated and put into cans.

The most vital problem confronting the manufacturer in the preparation of evaporated milk is to secure a supply of fresh milk of exceptional high quality. It is as necessary to control his milk supply as it is to control the processing in the plant. Specially trained men supervise the sanitary collection and care of milk at the farms and make provision for its rapid transfer to the plants. At the plant a

most careful inspection for cleanliness and freshness is given. A chance is not even taken on how the farmer might wash the milk cans—so they are thoroughly washed and sterilized at the plants all ready to receive the milk.

A system of equipment designed to meet the requirements of scientific and sanitary principles is employed to put the milk into cans. The first process is preheating the milk in glass lined tanks. From here it is drawn into the vacuum pan where the evaporation of the water takes place. It then passes through a machine called the homogenizer. This process forces the milk through microscopically small holes.

The effect is to break the large fat clusters into tiny globules, thus removing the tendency of the fat to be buoyed to the top to form cream. As a result, the butter fat remains evenly distributed in the milk, giving it a uniform composition. The next process is standardization. The United States Government requires a definite minimum standard for evaporated milk. This insures the composition to be constant day after day and year after year. Now the milk is ready to be filled into hermetically sealed tins, which are quickly taken through the final process, sterilization. The cans are put into a sterilizer where they are exposed to heat for a sufficient length of time to destroy all bacteria.

Milk Constituents

This concludes the care and processes which enable evaporated milk to go to the baker as pure and sweet as it was when it left the farm. Not one thing is left undone that might menace the production of a dependable milk.

The proteins, fat, sugar, and minerals are the constituents which give milk its nutritive and energy value. They form the solids of milk and are the components which we pay for. It is only reasonable

that their quality and quantity should gauge the price. When we figure the relative costs of milks, the milk solids, which measure their relative food value, must be compared. The United States Government requirements for market milk and evaporated milk are as follows:

Market Milk	
Fat in 100 Pounds Milk 3.25 lbs.	Total Solids in 100 Pounds Milk 11.75 lbs.
Evaporated Milk	
Fat in 100 Pounds Milk 7.8 lbs.	Total Solids in 100 Pounds Milk 25.5 lbs.

A comparison of these standard milks shows evaporated milk to have more than twice the food value of market milk. When the milk solids of each are compared with their respective market price the ratios will show the economy of evaporated milk.

A convenient size in which to ship and store evaporated milk is the number ten can which contains eight pounds net. However, it is advantageous to keep a supply of tall sixteen ounce tins, for these will take care of the requirements for a small amount of milk, or will prevent the carrying over of some unused milk from the bigger cans. The fact that it can be stored in quantities and is always ready for every milk need means shop convenience. Any dilution that is wanted can be readily made. All that has to be done is to figure the amount of milk solids that are needed in the formula, and then add water accordingly. For example, if evaporated milk is used in the Government standard milk, bread calling for 2.5 pounds solids, 100 pounds of flour and approximately 60 pounds of water, there will have to be 10 pounds of evaporated milk used to furnish the 2.5 pounds of milk solids, and only 52½ pounds of water will be required, because there are seven and one-

half pounds of water in the ten pounds of milk. If the baker wants a milk which has an approximate concentration of very rich market milk, he simply needs to add one portion of water to one of milk. Such a dilution is very satisfactory for rich cream fillings for cream puffs, eclairs, cake, and pie fillings. In the making of icings, evaporated milk is particularly adapted. When it is boiled with sugar, the tiny homogenized fat globules slip in between the sugar particles and continue to remain in this condition on cooling, thus preventing the crystals from uniting to give the sugary effect. The result is a creamy, fine textured icing.

A Nutritional Advance

The whole-wheat bread advocates would have us believe that we are headed for physical deterioration because we consume so much white bread. We hear a lot about the deficiencies of the white loaf and it is evident that the milling process does remove the cellulose and some of the minerals. But even the whole grain flours are deficient in some of the body building elements and especially in the mineral calcium. As has been said, milk added to the loaf supplements that which the flour lacks. It not only improves the food value and flavor but it gives a rich brown color to the crust and a creamy color to the crumb. In fact, milk bread is one of the most acceptable ways of taking milk. The milk loaf makes our nearest approach to the ideal loaf. It is one of the cheapest of nutritious foods, and its general consumption will work magic in the nutrition of the human race. So why mourn the loss of whole grain breads? We want white bread because for generations the habit has been woven into our very fibre. We like the "chew" of it, its mild, sweet taste, and lastly we experience a comfort from eating it, because every particle of

it is almost perfectly digested. When white bread was taken from us during the war, it shook the very foundations of our living, and only the awful visions of poorly fed soldiers could cause us to give it up. It is the most acceptable so why not use it as our most nutritious loaf?

Bread making is one of the most important single cooking processes known to our civilization. This is the consequence of a demand, because bread is consumed in larger quantities than any other article of food. It goes into the diet of most every civilized race of people, and is usually eaten three times each day. If all bread could be milk bread these races would be well nourished. A good milk bread has many features which will win the favor of the consumer. The initial cost may be a trifle more, but most people have formed the habit of paying more for quality in other things and hence will accept the slightly increased cost. All the forces working for nutrition should join the baker in educating the buyer of foods to the following facts: First, our diets contain a great amount of high priced foods. Second, they can be materially cheapened and greatly improved by the inclusion of more milk bread.

It is possible and quite probable that the baker will become the strongest auxiliary in the crusade for perfect nutrition. In this field he can perform a true, national, and humanitarian service.

As fuel for the human body white bread is found by the calory test to furnish 1,182 calories to the pound while whole wheat bread, due to the inclusion of ash and cellulose "roughage" contains only 1,114 calories to the pound. It may be that this higher fuel value leads to the appetite preference for white bread, when mineral salts have been otherwise amply provided for the human needs.

Becoming Known

SINCE the baker manufactures the most essential of all foods for the people, his mere existence in a city creates a lively interest in his personality and his way of carrying on. If the community's interest results in gossip that the baker is unsanitary in his plant's surroundings, or careless in the use and handling of ingredients, then this interest works all to the baker's disadvantage. How well are you known in your town and how heartily are you received in business clubs, civic associations, and in public life?

Some years ago a baker was strolling on the board walk at Atlantic City. A friend snapped his picture and waggishly offered to bet that he could paste it on an envelope and mail it to his home town, and that it would be duly delivered to him. The wager was made—and the snap shot duly arrived with only the word "Chicago" under the picture.

A certain incident made the identification easy. This baker had become chairman of the Mayor's Committee to raise a fund large enough to purchase for Chicago one of the few genuine portraits of George Washington in existence. As such he was on the platform at many public meetings and was pictured in the newspapers in groups of men doing the city's work.

Winter Doughs

Our problem during the summer months is to keep our doughs cool because they pick up heat not only during fermentation but also in the shop make-up. It is different now with the winter months at hand. This change in outside weather conditions must be taken into consideration regardless of how complete the weather control may be in your shop and

dough room. Your shop is not so warm, your machinery will often chill the dough, your pans are often cool, your flour probably has been kept in a relatively cool place. Because of all of these more or less uncontrollable factors we make the following suggestions to maintain baking satisfaction and quality goods.

Use flour that has been warmed through. In small shops it is good practice to keep two or three days' supply near the oven. It is often advisable to increase slightly the amount of yeast and reduce your time if necessary. You want a strong fermentation. Mix your doughs thoroughly and bring out from 2 to 3 degrees warmer. Mix doughs small enough that an entire dough may be made up in at least 20 minutes. Take the chill off your pans before using. Keep proof box above ninety and moist, but do not feed with live steam.

—G. Cullen Thomas—in a Service Bulletin.

Trade Associations

Trade associations serve a very useful purpose which is generally overlooked. In the prosecution of trade associations the public, and perhaps to some extent the authorities, regard the trade associations as representative of big corporations with huge accumulations of capital. The fact is that the larger and richer the corporation the less its needs for a trade association. It has in itself the means of obtaining all of the information which it needs in order successfully to compete. Not so with the smaller concerns. They cannot afford, except through pooling their interests through a trade association, to secure the business data at their own expense.

—General Information Bulletin,
National Confectioners Association.

Crust or Crumb for Strength?

*How Laboratory Experiment Overthrows Age Old Notion
About Nutrition of Bread*

By ROSCOE H. SHAW

Department of Nutrition, American Institute of Baking

THE instinct of the lower animals governed by their senses of taste and smell impels them to select the kinds of food their bodies require. With the advent of the art of cooking man in this respect ceased to be a natural animal and after long ages of civilization the senses may no longer be solely relied upon as a guide to correct eating. If this were not true the man suffering from obesity would shun the fat forming foods or excessive eating while his slender brother would eat them from choice. The diabetic without being advised by his physician would avoid sugar and the man suffering from Bright's would likewise refrain from eating meat.

We have not, however, entirely lost that instinct. There are certain other factors that influence our choice not so easily explained from the standpoint of smell and taste. Other things being equal unleavened bread has nearly the same nutritional value as the leavened variety, yet we would not hesitate in selecting the latter. There is a physiological reason entirely separate from the sense of taste and smell behind the fact that the one appeals to us more than the other. "Lightness" is bound fast to ease of digestibility. In leavened bread the thousands of tiny holes make possible the rapid and thorough mixing with the saliva in the mouth where the first step in its digestion takes place. The porosity of bread is a great aid in its digestion.

Flavors, while having no nutritional value, are of great importance in the digestion of food, for they excite the secre-

tion of the digestive juices. We know how the "mouth waters" when the smell of certain foods reaches us and we know too that the same sensation occurs at the sight of a tempting dish. The modern cook well understands that his viands must appeal to the senses of sight and smell as well as to the taste.

The beautifully browned crust of bread with pleasing appearance and odor excites the flow of saliva. When taken into the mouth the agreeable nutty taste acts as an appetizer and its hardness gives the exercise to the teeth not required with the soft inside.

Travelers from abroad frequently bewail the fact that American bakers do not make the delicious hard rolls and crusty bread that they had found in the restaurants and hotels in Paris. The idea somehow seems to have taken root with some that the crust is the real part of the bread and that the crumb is a sort of necessary nuisance. It is no uncommon sight in restaurants to see people discard the crumb of hard rolls and eat only the crust.

The crust of a loaf of bread or roll had the same original composition as the crumb or soft center. Certainly nothing is added during the process of baking and no beneficial change seems likely except the dextrinization of some of the starch which makes it slightly more easily digested. On the other hand since the crust is hard, compact and lacking in porosity, it is logical to believe that whatever benefit is derived from the dextrinization is more than overbalanced. It also seems possible since the crust has been heated

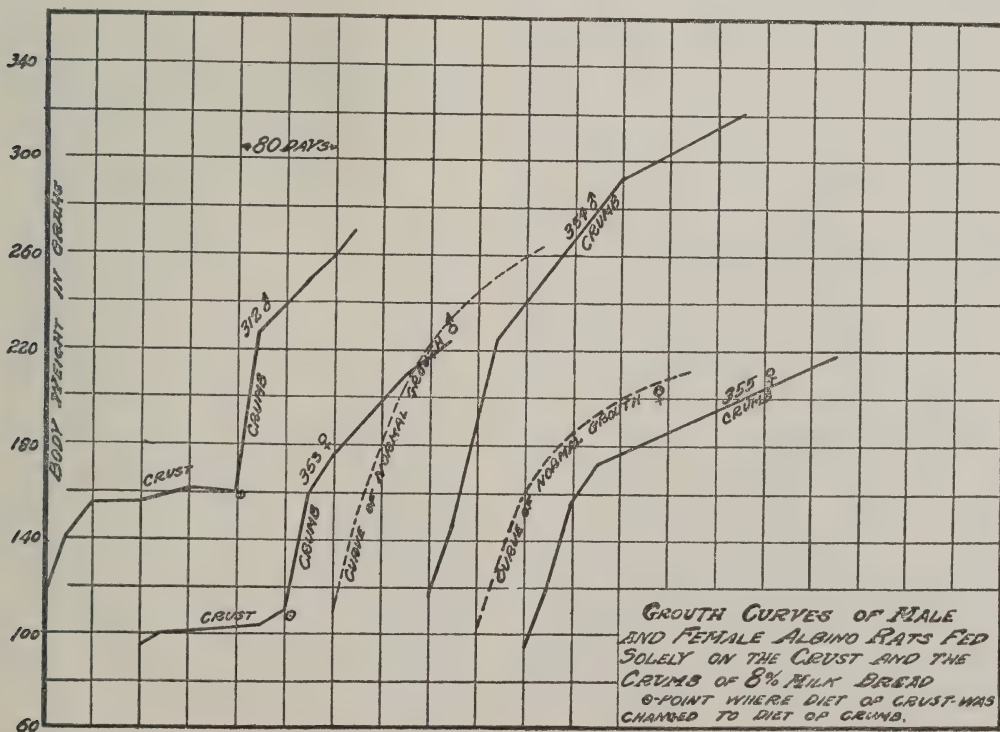
to a higher temperature in baking than the crumb that the protein or perhaps a vitamin has been impaired.

In an effort to throw light on the comparative nutritional value of the crust and crumb we conducted a simple feeding experiment with white rats. The bread used was made from a standard formula in the bake shop of the institute. It contained 8 per cent, in baking language, of whole milk solids. In other words the bread was equal to bread in which the entire liquid ingredient was whole milk. Such bread has been found by ourselves and others to support growth in young rats in nearly a normal manner. It was baked in pans, and steam was introduced into the oven as is customary in commercial baking. In short, it was the same sort of pan bread usually found on the market except that it contained more than the average amount of milk.

After cooling and standing in racks over night the top crust was sliced off with

a sharp knife with care that little or no crumb adhered. These slices were ground up in a power mill. The remainder of the loaf was then cut in thin slices which were air dried and ground up in the same way as the crust.

The white rats selected were from the same litter, young and in their vigorous growing period. They were placed in individual cages. There was always a supply of their particular food before them and in addition plenty of clean drinking water. They were under frequent observation and at regular intervals were weighed. From the beginning the rats on the crumb made constant gains in weight. As will be noted in the chart their curve of growth differed little from the normal growth curves which shows how they would have grown had they received a ration complete in all essentials. The appearance of their fur, etc., denoted health at all times. In contrast, the rats fed the crust made but slight gains. Their fur



became rough and they had the general appearance of being out of condition. When by repeated weighing it became apparent that they would not grow on the diet they were receiving it was changed to crumb such as the other group was receiving. The response was immediate, the fur took on the "sleek" appearance of the healthy rat and their weight regularly and consistently increased. From that point on, which is indicated by a small circle on the chart, their growth curve took an upward slant and closely approached the curve of normal growth.

Crust for Weakness

A male and a female rat were used with each diet. The male rat receiving the crumb, weighed 115 grams at the beginning of the experiment and 318 grams at the end. The female on the same diet weighed 92 grams at the beginning of the experiment and 318 grams at the end. The female on the same diet weighed 92 grams at the beginning and 216 grams at the close. Both these rats made regular and consistent gains throughout the entire feeding period.

The male rat on the crust diet weighed 115 grams at the beginning, gained for about 40 days and then remained practically at a standstill for about 4 months when he weighed 160 grams. At this point his diet was changed to crumb. He began to gain at once and in another 3 months weighed 270 grams. The female rat on this diet weighed 95 grams at the beginning, gained only 15 grams in 3 months when her diet also was changed to crumb. As with the male, there was a quick response and in 5 months, at the end of the test, she weighed 224 grams.

From the foregoing chart and figures it is evident that the crumb is more nutritious than the crust. Just what has been lost by the crust will be the subject of further study in the nutrition laboratory.

The crust of bread, while of less nutritional value than the crumb, has an important role in digestion. By its attractive appearance and odor it excites the secretion of the digestive juices. Because of its agreeable taste when taken into the mouth it acts as an appetizer and its hardness furnishes exercise for the teeth.

Crumb and Strength

Although it is the crust that makes the appeal to us we must not lose sight of the fact that it is the crumb that forms the real nutritive part of the loaf. From this standpoint alone French bread and rolls are inferior to the softer variety which forms the greater part of bakery products sold in this country.

As compared to ours, French bread is made from an inferior grade of flour and a "lean" mixture. Milk is rarely used. From the standpoint of nutrition, however great the appeal of the beautiful French loaf, it falls far short of the American milk made bread baked in the pan.

The writer takes this opportunity to acknowledge the valuable counsel of C. B. Morison of the American Institute of Baking at whose suggestion this feeding experiment was undertaken.

(Concluded from Page 12)

ways, building methods, seasonal operation, scientific investigation in the use of materials, and a dozen directions—for we are here dealing primarily with existing wastes in distribution. The wastes in these other directions are of vast importance and can be organized out.

The practical enforcement of such eliminations lies entirely within the distribution trades. The organization of the distributors can absolutely enforce standards and simplifications and other waste eliminations which are initiated in cooperation with the production industries. The power of enforcement of all this program lies in the hands of the distributors of the United States.

Four excellence

SHELLY BROS., Limited, of Vancouver, B. C., evidently do not believe in preaching bakeshop in their little "house organ." They get it out for their own personnel and rather than scolding it preaches a kind of Christianity in business. It's against the naked fang as a weapon of the "main office," and doesn't anywhere pop a lash threateningly over the plant's people.

"In the life of Christ," writes Roy A. Hunter, its chief editor, "we celebrate the advent of One who brought a **new** idea to Earth. The thought of kinship and brotherly love, mutual help and care and thought for the unfortunate and weak was such a revolutionary idea that the Author of it was killed. The idea, however, has persisted for almost twenty centuries and permeates every phase of our lives today.

"Our responsibility for our brother is today unquestioned for the **idea** born 1924 years ago is an actual, working reality. If an athlete trains and trains and trains there is always a strong probability that he will go stale. We are prone to point with righteous scorn to those who devote a disproportionately large share of their time to a search for pleasure and a gratification of those whims that seem to promise most fun. There is a tendency to lean over backwards in our efforts to show how free from this vice we are.

"Money? Yes, it costs something to go to a show, but it may be mistaken economy to be housebound. Jill may become a dull girl with too much grind at home, and too little thought about things outside. My boy, take a night off and take her to the show. A good laugh will do her good and give her something to chuckle over while she works over the dish pan and the ironing board."

A Happy Dozen

THE "Exchangeite," a periodical published by the Exchange Club, which has clubs in almost every American city, proposes for a heroine's reward a certain mother of Salt Lake City, Utah. This mother is the wife of Carl A. Badger, attorney of Salt Lake City, who has served several terms as a state senator.

Of her virtues the paper says, backing its editorial judgment by a photograph of Mrs. Badger and her twelve children:

"She bakes twelve loaves of bread every other day, starts nine children to school every single morning, writes to the absent boys every Sunday and does everything that any mother does in the home only on an enlarged scale. In her spare time she teaches literature in the woman's society in her church and is consulting physician and nurse to the entire neighborhood. Her husband says that she has not found time to be divorced, smoke cigarettes, or bob her hair. Mr. and Mrs. Badger are in their middle forties but do not look it."

Once upon a time families of the size of Mr. Badger's were known as "Utah's Best Crop," and were very common in that country. Now they are less common. Possibly she would scorn such aid but why doesn't some Salt Lake baker solicit the lady's trade with a really modern loaf? She might prove like most of her modern sisters after all in this one regard of seeking escape from an ancient drudgery that can now be performed by electricity in place of muscle and machines in place of backaches.

It was quite a jolt to get a score of 88 on a sample of bread sent to the Institute for scoring. This had its good effect on us, however, and we are sending better bread today.

—A New York Baker.

Books for the Baking Laboratory

HYGIENIC FUNDAMENTALS OF FOOD HANDLING. By Charles Thom and Albert C. Hunter, 21 figs. 228 pp. Williams and Wilkins Co., Baltimore, 1924.

The proper handling of raw foods and food products for the purpose of protecting them from spoilage which spells food waste, and contamination, which may mean disease, is a highly important problem for the manufacturer, the distributor and the consumer.

At present food handling appears to be largely an empirical and "rule of thumb" proposition which has not received scientific study except in a few industries. Such empiricism and lack of scientific methods have been the cause of much food waste, as any federal, state or city food inspector can testify.

Much food has been condemned as unfit for human use which might have been saved if the proper method of handling had been used by those responsible for its production and distribution.

As the authors state, "with the increase in the cost of food, producer, dealer and consumer alike become more interested in its conservation. In addition to losses from disease and other agencies at the point of production, there is an enormous wastage all along the distributing line which carries food from the producer to the consumer. Thieves carry away, rodents and insects eat and pollute, bacteria, yeasts, and molds ferment and rot; natural changes within the products themselves render some of them worthless. These losses increase directly with the time and distance involved in transportation to the ultimate market unless the utmost of intelligent knowledge is applied in packing and transportation."

Not only does the problem include the protection of our goods from spoilage, but also the potential dangers of food poisoning and infected foods as carriers of disease.

The contemporary study of food handling problems has been carried on largely through state and federal agencies and special research investigations by food manufacturer's associations among which the National Cannery Association is a notable example.

The authors of this book, Messrs. Thom and Hunter, have participated in the study of many food problems in connection with their work in

the U. S. Department of Agriculture and can thus discuss them from a background of personal experience which is exceptional.

The scope of their discussion of hygienic food handling includes the following: Fitness for food and wholesomeness defined, food preservation, spoilage, food poisoning and food inspections, cereal products, sound fruits and vegetables at the factory, sound plant products, eggs, milk, fish, shellfish, poultry, meats, water, beverages and market sanitation.

The chapter devoted to cereal products discussed respiration during the storage of cereal grain, their milling, tempering, souring or acidity, mustiness, insects and temperature.

The cereal grains are staple products which may be stored ordinarily with but very little or slight deterioration. The two important determining factors are the amount of water present and the temperature of storage. While the cereal grains carry a rather large amount of micro-organisms, bacteria, molds and yeasts, these remain inactive under proper conditions of storage. The bran coats are always contaminated and frequently infected, the germ is frequently infected with molds and bacteria of one to several species but the endosperm is less commonly infected. "Under satisfactory conditions of storage, activity on the part of these organisms is negligible with slight increases in moisture content or temperature or both, the metabolic changes in the seeds or fruits themselves begin to be more active, and particular species of micro-organisms may begin to multiply so that spoilage appears in the form of souring, heating, mustiness and moldiness. At the lowest figures for such activity the numbers of species active is but one or two. Progressive increase in moisture content involves a rapid rise in the number of growing species with co-ordinate increases in destructive effects."

When cereals are milled after tempering, "the bulk of the original microflora goes into the bran" and the large part of the remainder into the germ. "The flour receives a considerable inoculation of molds spores and bacteria which pass through the finer screens or are drawn out as fine dust by the aspirators. The firmer portion of the endosperm has been shown to be much more free from viable microorganisms than the other mill products."

"Mold activity in cereal products begins at a comparatively low moisture percentage. In corn meal and similar products, some growth is readily detected when the water present reaches or passes 13%."

Bread, ropy bread and salt rising bread are discussed by the authors. Their statement that "water constitutes about 35 to 45 per cent of the finished product" is open to criticism, unless this range means only moisture present in the crumb of the bread and not total moisture of the loaf. The total moisture of bread, that is, as determined on samples containing the crust and crumb is in our experience on the average well below 38% one hour after baking. A bread containing a total of 45% water would be underbaked.

The authors emphasize the necessity of excluding contamination and the necessity of proper cooling conditions for the prevention of mold development.

The maintenance of a proper acidity in the dough for the prevention of rope is pointed out and also the use of lactic acid in this connection.

Koser's study of a culture used for the preparation of "salt rising" bread and his identification of it as *B. Welchii* is referred to by the authors as of interest from its medical relations.

In discussing the possibility of bread as a carrier of surface infection, the authors recognize that such contamination can be minimized by proper wrapping as is now commonly practiced.

The "Hygienic Fundamentals of Food Handling" is an interesting book to read, and also for reference. Those concerned in the study of food problems will find it of considerable value in a field where at present there are but too few general texts of similar scope which are at all up to date in their summary of recent work.

C. B. MORISON.

"Wheat Studies," is the title of a new series of publications of which Vol. 1, No. 1, is dated at Stanford University, California, December 1924. The studies constitute a comprehensive world survey of the wheat situation. They are highly informative and are written to give the reader a view of wheat as a world crop. The "deficiency countries" are dissected by the laboratory processes. "Surplus Countries" are played up against deficiency countries so that the reader can gather whence and whither the current world wheat crop gains its momentum. These studies are well worth having in the library of any baker or miller. They may be obtained from the Food Research Institute, Stanford University.

Abstracts of Technical Articles

Selected for Baking Technology from Chemical Abstracts

Antiscorbutic potency of whole-milk powder. G. W. Cavanaugh, R. A. Dutcher and J. S. Hall. *Ind. Eng. Chem.* 16, 1070-3 (1924).—The antiscorbutic value of mixed milk from 1276 cows as received at a commercial drying plant was tested. The rest of this milk was condensed in a steel continuous evaporator and pasteurized after condensation in a closed glass-lined tank in the absence of air and sprayed under pressure into a heated chamber (Merrell-Soule Co.'s process). The dry powder possessed antiscorbutic properties identical with those of the raw milk from which the powder was made.

H. B. Lewis.

Bread troubles in the light of hydrogen-ion concentration. R. J. Clark. *Cereal Chem.* 1, 161-7 (1924).—A discussion of the different materials used in making bread and their relation to H-ion concentration of bread.

Ruth Buchanan.

Lipids, a factor influencing gluten quality. E. B. Working. *Cereal Chem.* 1, 153-8 (1924).—Experiments given show that phosphatides added in small quantities to flour injure gluten quality as measured by the feel of hand-washed gluten, by viscosity, and by baking tests. Prolonged washing of soft gluten of low-grade flour removed phosphatides and gradually increased the tenacity until the gluten was practically equal to that from patent flour. Removal of ash salts from flour by extraction with distilled water removed a significant amount of phosphatide, as well as proteins and possibly pentosans in an amount sufficient to affect viscosity.

Ruth Buchanan.

The cake-flour laboratory. P. M. Patterson. *Cereal Chem.* 1, 159-61 (1924).—The cake-making qualities of a flour are dependent on (1) a uniformly fine division of the flour particles, freedom from chunks and flakes; (2) the relation of gluten quality to physical condition, and also the physical condition after being acted upon by various solutions, representing the end products of baking-powder reactions; (3) inclination of the gluten colloid properly to combine and maintain its relationship with the batter emulsion.

Ruth Buchanan.

Winning Over Ignorance

A RECENT association activity affords an excellent example of what such work may mean. Baking is perhaps one of the oldest industries, but it is only recently that the potentialities of science have been realized by the bakers, following the marked success of one of their number who had the resources and the courage to go thoroughly into the matter. Of the thousands of bakers in America but a very small fraction would find it possible to support research in continuity on a basis sufficiently broad to insure reasonable success. Yet in the American Bakers Association all can bear some part of the cost and benefit from the results obtained through an institute which strives to provide a service on production problems, to study the fundamentals underlying baking, and to afford facilities for the special training of those either in or about to engage in the baking industry.

The part which laboratories supported by Government appropriation have played in the assistance of industry has grown rapidly since 1900. Governments generally set up elaborate plants to undertake problems essential to industry, but not ordinarily engaging their concentrated attention, and more recently have organized advisory committees from within these industries to guide them in the selection of research problems, to assist in the interpretation of results, and frequently to place at the disposal of Government specialists plant records and facilities of greatest value. The Fuel Research Board of Great Britain furnishes a special example of impetus to investigation growing out of the war. The laboratory of the Department of Mines in Canada is another illustration of a remarkably complete unit established as an aid to industry. The laboratories of the

Bureau of Mines, the Department of Agriculture, and the Bureau of Standards of the Department of Commerce may be selected from the several activities of the United States Government. Industries have even been offered the opportunity of placing holders of fellowships within these laboratories to work under the direction of those in charge and to have the great advantage of the extensive equipment and direction of men devoted to scientific work in prosecuting their own special studies. Publication privileges rest with the laboratory.

—From "These Eventful Years"
by the Encyclopedia Britannica.

Advertised

More than one Japanese problem afflicts our West Coast, according to rumors from westward of the Sierras. For instance one Washington baker wants to know how fine a piece of advertising Elmer Cline and the members of his Trade Relations Conference would consider the slogan of a Japanese baker of North Yakima. It graces the sides of his delivery wagon: "Jim Tonkyhama, Biggest Loafer in Town."

If a man today is ashamed to admit that he is a baker, there is something wrong with his mental attitude, and if he is proud of his vocation then I cannot see why there is not more activity among the American bakers in lending their support, both morally and financially to the splendid work being carried on by the Institute staff. The Institute staff is doing a stupendous task in planting our standard at the head of American industries, where it rightfully belongs.

—L. A. Schillinger, Baltimore, Md.

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Light and Leadership

A NEW leadership drove its way through this week in the affairs of the baking world. It was not a leadership of money, or even of power over bakery properties. It was a leadership of light and understanding. Its personnel included many hired men on the payrolls of others but all were articulate men. They were men who knew how to tell a story—the story of consumer satisfaction gained by the best

baked goods it is possible turn out of pans passed through ovens, and made of the ingredients best adapted to the conserving of healthful human life. This newer leadership organized itself to do for the

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advertising and tell-the-story departments of the baking world what the bakery engineers did for the production world, and the scientific research men did for the nutritional field. Backed by correct production and research methods it will be from now on a nation-wide problem to center all national advertising about foodstuffs on a central, educative theme. Would you expect a man who spends millions in

milk advertising to sit down with a man who spends millions on meat advertising and have both tell the advertising spenders who make up the story for bread, that the bread man has the central theme in

whose refrain both of the others must join to get the best results? Such a group met at the Hotel La Salle preparatory to the conference on sales and advertising methods at the American Institute of Baking on February 16 and 17. They planned the main drive for this latter conference and came to a common agreement on what constitutes the most educative themes on which to sound a common note in 1925 advertising campaigns.

The very personnel of those who attended this conference augurs well for the future of our industry in its fellowship with the allied industries. When it came to agreeing upon the grouping of other essential foods around bread until these foods together have shaped up a balanced meal completely capable of sustaining life in the best possible manner, there was not a dissenting vote.

Basic Foods Only

The list of food advertisers whose representatives were not invited and were not wanted was as conspicuous by its absence as the list of advertisers of soundly basic foods was conspicuous by its presence. On this list were those making unfit foods and unessential foods that nutrition workers and scientists dealing in human nutrition, regard as detrimental to health and the well being of the race.

A curious incident happened while the conference was in session. There appeared at the doors of the American Institute a veteran scoffer at white bread and white flour. He had toured the country telling school children that they must eat the "roughage" of whole wheat and its mineral salts, in order "to live long and have good health." He had warned them that white flour was "poison." He had blamed the millers for milling it and the bakers for baking it—and had accused both of foisting it upon an unwilling population. But this veteran was in an-

other mood now. He wanted to start all over and support white bread as the world's best source of energy food, this bread to be eaten in combination with other food essential to the obtaining of a completely balanced diet.

Why did he change? He came to see that children could be coaxed onto whole wheat bread only by pressure and force and could not be kept upon it when given a free choice of foods. From the literature he learned that millers were beaten away back in the days of Nero on the charge that they had not made their flour as white as possible—which was equivalent to being in the words of the Roman chroniclers "as good as possible."

A Veteran Repents

This veteran was taken out to the nutritional laboratories of the American Institute of Baking where he saw test animals thriving on milk-mixed white bread in better shape even than on whole wheat bread alone, and he saw other animals rearing newer generations when fed on milk-mixed white bread plus an occasional leaf of lettuce. This one veteran had now become "oriented" to the whole truth of nutrition instead of being a flaming apostle of a notion gained through only half of the essential data needed.

And in just the way that he spoke contritely of his past and hopefully of his future, so these men who have the task of telling the story of the basic foods, spoke contritely of a past when the milk man advertised that one quart of milk was equivalent to so much beefsteak and was as nutritious as so many eggs. The milk spokesman saw now that in a scientific diet milk had a certain role to play and that eggs and meat and bread had other important roles to play and all were in full partnership in the building up of the balanced meal.

Just so the meat man told of ancient

nonsense in which the meat men sang the glories of red, red meat as against cereals, instead of noting that meat and bread and milk had always been "married" and had lived happily together as the major factors of the human diet.

Milk in the Diet

To this conference M. D. Munn, president of the National Dairy Council, brought the idea that nutritional science ought to dominate advertising practise. He noted that the proteins of milk were so much more available in human metabolism than cereal proteins that sometimes milk, added to cereals, carried a much larger proportion of cereal foods into use than when the cereals were eaten alone. He favored a union of the advertising forces behind basic foods in campaigns, each to glorify its own role in complete nutrition. He told how the National Dairy Council had come to the view that an educational campaign in the schools, divorced from immediate commercial contacts, was the wisest thing to attempt.

D. D. Davis, manager of sales and advertising for the Washburn Crosby Co., brought the idea that he favored a common stressing of one theme for one year's campaign and then the common switching of this theme by all concerned for another year. He spoke of the confusion that comes with one National advertiser stressing the sanitation of the bakery, another stressing nutrition, another stressing specialty products and another stressing the value of his own food against an essential associate.

Taking Step Together

Mr. Davis favored full and unabridged control by each advertising company but he favored frequent conferences so that each could get the measure of the common picture each in his own way would seek to paint.

A. P. Husband of the Millers National Federation brought in the promise of his association to yield full cooperation.

D. P. Chindblom of the W. E. Long Co., and Walter Warrick of the same company displayed advertising cards representing the effort of this company to take step in harmony with the new idea. The advertising cards showed hams sliced and being used as sandwich fillers for bread. Glasses of milk filled the background in another bread advertisement. Still other cards showed a wide variety of foods that are used with bread,—jellies, cheese, honey, butter, bacon, and fruits.

Bread and Meat

C. W. Myers of Armour & Co., immediately matched the exhibits of the W. E. Long Co., made for bakery clients, with exhibits of his own, representing the contribution of the packers under their slogan, "Bread and meat for health complete." He asked for copies of the Long car cards to place on exhibit in his own office along side of the packers' contributions to the same cause. They were provided.

Drs. H. E. Barnard and L. A. Rumsey of the American Institute of Baking sketched the history of the Institute's campaign for "bread and advertising" and for the idea of "advertising it as it is eaten." Credit for first proposing such a campaign was given to John Burns of the Allied Trades. Its general progress was sketched through the bringing in of one food product after another, until all basic foods were covered.

Knew Nutritional Data

C. E. Grey of the California creameries, agreed with Mr. Warrick that nothing was more unattractive, in a poster, than any isolated package of food such as a pound of butter, a loaf of bread, a piece of meat, or a bottle of milk. He agreed, however, that when put together as the

making of a balanced meal they had the effect of arousing appetite and stimulating a desire to enjoy such foods in combination. Therefore, he said, his company had ceased to print advertising of its product in isolated form. He told of the efforts to get milk products made under complete acidity control.

J. C. Brown of the Beatrice Creamery Co., told of the butter advertising that takes step with the new basic-food-group idea.

An odd feature of this remarkable conference was that nearly every man present, whether in the advertising or research department, was conversant with the nutritional feeding tests of McCollum, Eddy, Sherman, and Mendel, and with the work in animal feeding within the foods industries. Mr. Munn, for instance, knew the answer to every form of milk feeding in about every possible combination with bread, meat, and fish feeding. He knew the results both upon rats and puppies and on chickens, and so was confident of just what role each basic food has a legitimate right to play in making up the balanced meal.

Change in Style

How startled the world would have been if a survey, ten years ago, had shown a community as using 94 loaves of bakers bread for every four baked at home. In San Francisco 1047 women were visited in taking a census of home bakers. Out of these 987 were buyers of the family bread. But how different it was with cakes and sweetgoods. The Magnus Fruit Products Co., which is developing popularity for the slogan, "Let the baker supply your family dessert," found that out of 1,000 housewives visited only 132 were buying bakers' pastries and sweets. Lack of confidence in packed fruits used as pie and cake fillers no doubt has much to do

with this, and this confidence can be built up by quality fillers as it has been for bread by quality loaves. This plus education of the public to what the facts are. Here is a splendid field for immediate tilling.

Brewing Reversals

The old saying was that it "is aristocratic to brew but not to bake," but it seems to be changed now so that it may be well to say that "it is aristocratic to bake but not to brew." It is very pleasing to me as I look back to the time when I called the meeting to order that resulted in the forming of the National association in 1897, and to realize through service for the first eight years on the Executive Committee what service was done in that time and what is now being followed up. I think we have got to give a great deal of credit to the Association for the respect that is now shown to the industry.

—F. R. Shepard, 62 Bunker Hill St., Boston.

The eleven presidents of American Bakers Assn., who are Rotarians certainly make an imposing group as they are pictured in the January Rotary Magazine. I do not know of any industry that has any finer quality of men in its leadership than has the baking industry. It is a splendid comment on their past training to know that all are Rotarians.

—Charles W. Myers, Armour & Co.

My wife and I were both so interested in the story on "Pa Pasteur," in the magazine called "Dough," that we asked the Oregon Merchants Magazine to reprint it. It did so. I believe every baker should become familiar with the information contained in this story and in "The Romance of the Holes in Bread."

—H. H. Haynes, Portland, Oregon.

The Bakery Merchandiser

*Trade Promotion Conference Develops Fact that He is Ready
to Supersede the Bakery Salesman*

DO you know, Mr. Baker, that the salesman on your wagon or truck who is a "good fellow" and likes to know grocers personally is a fine asset in stores where there are many clerks, and that the "plugger" type of salesman outsells him in stores where the proprietor himself does most of the clerking?

This odd fact came out as one of the settled conclusions of a hundred-odd men who have to do with bakery sales forces and who assembled at the American Institute of Baking in Chicago, Feb. 16, to put the merchandising of bread on the same fine basis that bread production has now achieved.

The conference, called by Elmer Cline of the Trade Promotion Committee, American Bakers Association, was a huge success. It brought men from far distant Texas and the Pacific Coast. They were earnest men, intent on getting the best data that is to be had on the problem of merchandising bread.

Elmer Cline set the tone for the two days of conference when he stated that the days of secrets and secrecy were past, and the day of professionalizing bread merchandising efforts was at hand.

All present agreed that the bakery merchandiser was now due to arrive in the industry as certainly as the bread salesman, whom he would supplant, has succeeded the bread driver.

This bread merchandiser was appraised, described, and held forth as a man who can bring enormous growth into the bakery world within the next ten years.

The coming decade was hailed as a decade of intensive study upon bakery merchandising just as the decade now passing

saw an intensive study and development of bread production.

"The markets," declared Elmer Cline, "are constantly changing—from the control of the man who does not serve them best to the man who does serve them best. With other food interests putting pressure behind their campaigns to get other foods than baked foods into consumption, we must unite to hold up the baking industry's end."

Harry Fawcett of Regan Bros., Minneapolis, sketched the coming bread merchandiser as a man who knew the production room and the production manager, and knew his product so well that he would always fight for it on a moment's notice. He told of the enormous increase in sales his men could make when they knew their bread, both as production men and as packing room men. Such merchandisers never took out bad bread or badly packaged bread. He said his merchandising force all began with an apprenticeship inside the shop.

Dr. Barnard set the note of the problem in a paper on consumptivism which appears elsewhere in this issue.

There are four copies of the "Nation's Business" on my desk. One is mine. The other three are marked copies sent over by friends. All this is great stuff, impossible five years ago. When Mother wiped her floury hands on her apron and jumped in the flivver to go to the movies, the baking industry got up, yawned, rubbed its sleepy eyes and grasped an opportunity. The corner bakery—formerly a convenience—became a dignified industry with a source of responsibility.

—Henry Stude, Texas Bread Co.

BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

I. K. RUSSELL, Editor

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We Work Together

To win through knowing our markets and developing their full potential possibilities, a higher place for the baking industry in the great family of America's business life.

Julius Fleischmann

IT is hard to think of Julius Fleischmann as dead. He has started too much that will live as long as the baking industry lives. It was no industry when he found it. Its personnel worked by incantations and necromancies. The nature of yeast had hardly been discovered; its role was not yet known in the leavening of bread.

A world-wide revolution followed the discovery of what causes fermentation and how, and in this revolution the making of bread was moved over from a craft to a science. Julius Fleischmann peddled yeast from door to door and so did his mother, we are told. He did it at a time some of our best modern bakers peddled bread from door to door.

It was fortunate for him, personally, and for the baking industry, that he saw the oncoming of Scientific Control in the bake-shop. He saw the oncoming industrialization of the ancient craft. So he traded

other stock for yeast stock and gained control of the yeast business in which his family had before been merely a minority voice. He builded for Science, for more than most medical men and most scientists he appreciated the great truths of the Pasteurian discoveries.

A beautiful scientific institute in the Bronx, equipped for every possible form of research in the bacteriological field, is the crowning gesture of Julius Fleischmann's interest in bakery science. Like the Rockefeller Institute and our own Institute of Baking, it is a child of that first institute ever founded in Pasteur's honor, the Carlsberg Laboratory at Copenhagen.

Service men working in every town and hamlet to make bakers' bread better, betokened the manner in which bakery science first infiltrated its way into the shop. Thousands of billboard signs and millions of streetcar cards and posters betokened the manner in which respect and popular acceptance was built up for bakers' bread as the baker began to turn out a finer product.

As an Employer

BUT it is as an executive and an employer that Mr. Fleischmann will leave his mark permanently in the lives of his young men and those not now so young as when they entered his company. Who ever saw a Fleischmann man who in the secrecy of his final confidences had a rankling heart over wrongs done him because he could not effectively protest? Who ever saw a Fleischmann man with that beaten-down expression that comes to all subordinates over whom leaders crack a wicked whip lash and assault all manifestations of those traits in their character which add to the joy of life and self-expression? When men tyrannically overriden from above have had sore hearts to display in confidence, Fleischmann's men have told of the fairness with which their

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BAKING TECHNOLOGY

furniture was moved when they had to change stations, of how their service built them up in the world. One could find greying veterans among them. Men were not merely used to be "junked," as too often happens in industry.

At this moment the writer thinks of the seasoned veteran, Mr. Trent of Ontario, Canada, who as he turns to the last ten of his three-score years and ten, finds Trent Hall at Guelph arising to honor him, with his beloved "chief" using the company's profits to foot the financial bill. What does Trent think of his chief as he sees his own life coming through to a quiet harbor instead of wreckage on the hostile coast of Old Age?

Industry's Beauty

INDUSTRY could be beautiful if it were completely directed by men who loved, as Julius Fleischmann did, to see subordinates happy and growing, instead of slapping them down as hard as it is possible to do. At a dance he saw young ladies looking sad because the union rules prevented the orchestra from playing a minute longer than their three hours' engagement. He stepped up to the leader, doubled his pay, for the evening was yet young, and waved his hand to those on the floor. "On with the dance and be happy," he cried, and went to his rest contented.

A Hired Man's World

THIS world is changing into a hired hand's world. Men on wages and salaries do nearly all its work. In such a world Julius Fleischmann did his bit to make the hired man's lot endurable and free from devastation.

The evidence that this leader moved with his times and ahead of them is shown by the fact that almost everywhere one turns the sunshiney office force is the one that warms business into life.

Boys — and a Policy

TWO little boys, walking along the country road one day, came across a walnut tree. Liking walnuts, they decided to investigate to see if any could have dropped off the tree. They discovered one walnut on the ground and, while they were trying to decide how to divide this walnut, a third boy came along and seeing their predicament told them he would divide it for them. He immediately cracked the walnut in two, gave each of the little boys one of the half shells, saving for himself the meat of the walnut, and therefore the division was made.

How many bakers in the country today are so busy fighting among themselves over the business in their community that they become blind to the fellow in the back ground who comes along and picks the meat of the business for himself? This does not necessarily mean that the third party is a big baker or has plenty of money. He might be just an average baker with very little capital, but watching from the side lines the two bakers fighting each other for the business, immediately starts the third plant and, while they are busy with each other, proceeds to make good goods, merchandise them properly, and immediately sells the housewife on his products.

Let's be careful we do not get into this position. Let's work with our competitor in getting all the business in our home town and not work against him in trying to land the business for ourselves and allow someone else to start a bakery in our town and take what rightfully belongs to us.

LEWIS F. BOLSER, *President.*

All of us in the baking industry owe a vote of thanks to the Nation's Business for playing up a bakers' story at the front of the magazine. Editor Merle Thorpe made us much his debtor.

A New Force in Industry

*It Is Called Consumptionism and Has to Do with
Developing Consumer Demands*

By H. E. BARNARD

Director, American Institute of Baking

A NEW force lies across the path of business. That force has been defined as "Consumptionism," a new word coined to express a new necessity, the need to make men want the things which over-developed industry must turn out. Through all the years prior to this new era of productiveness opened under the stress of war's emergencies and now firmly fixed through invested capital, efficient organization and high pressure salesmanship, the problem was to produce enough of the things men wanted. Today the problem is to make men want and use more than enough things. The economic emphasis in business is shifting from the transformation of raw material into finished product to the development of a consumer need which will keep the factory in constant operation. The task before us is no longer how to produce the goods, but how to produce the customers.

To the baker consumptionism is the science of compelling men to use more and more bread. It is an apt word. And it is more pregnant with potentiality for our industry than those other catch words which once intrigued our imaginations and so directed our efforts. Sanitation—Quality—Service. Those were strong words in their day. They stood for real needs; they marked the banners we lifted high in our march out of the craftsman's shop with all of its unpleasantness into the modern factory; as we developed new processes and learned how to handle raw materials; as we improved the methods of placing baked goods in every home, fresh and clean and attractive. The day will

never come when sanitation and quality and service no longer apply to our industry, or when they need not stand out as guide posts for those who are coming up. But the time is now here when in truth we can say we have made those goals, and, confident that our public is in full agreement with us, bend all our efforts to increase the consumption of our bread and cakes and pies and all the other products of our ovens.

In a recent address I named five reasons why it is hard for the baker to increase the use of his products. None of them have to do with sanitation or quality. They concern other fundamental causes. May I list them for you:

1. The increasing variety of foods.
2. The cumulative effect of attacks on white bread.
3. The belief that starchy food is fattening.
4. The passing of the dinner pail.
5. The increased earning power of the worker.

When I set up those hurdles before our advancing industry it was with some misgivings. I doubted for a time the wisdom of urging between meal feeding, and it certainly looked at the outset a bit foolish to offer the carbohydrate food, cake, to the child whose appetite loudly demanded that pure carbohydrate—sugar.

Every one of these obstacles to the greater use of baked goods must be grappled with and removed. That is not an easy task. Alone no baker can successfully meet the issues. Intensive salesmanship, even when backed by the finest kind

of intelligent advertising, will hardly dent the opposition to increased consumption. It is true that increased business may be earned by superior products and more intelligent distribution but the business comes, not through greater consumption but at the competitor's expense.

There is no economic advantage in such methods of gaining business. Rather, they lay an extra burden on the consumer. The baking industry must be developed for the benefit of the whole industry and not for the profit of small groups which lead in the application of signal ability and the highest efficiency in the production and distribution of their products.

In many sections of our country the market for bread is fully developed. This is especially true in our cities where Saturday is no longer baking day in the modern home. It is still far from true in country districts where transportation is poor and where commercially baked goods cannot easily reach the home.

A survey of our markets is then of first importance in any discussion of consumptionism. Where do the undeveloped markets lie? Each baker must determine for himself the possibilities of increasing his volume by adding new custom, or increasing per capita consumption. But American Institute of Baking speaks for the industry and our survey of the situation must include a study of the markets, not of Ohio or of Nebraska, or of Chicago, but of the whole country.

In 1910, 54.2 per cent of our population of 92,000,000 people lived in the country and it was a country far less closely in touch with the city than is now the case in this era of good roads and an automobile in every farmyard. In 1920 46.8 per cent of our population of 106,000,000 people lived in the country. During the past five years this percentage has been rapidly lowered until we are safe in saying that while 15 years ago 40 per cent of

our population was beyond the reach of baker's bread today that number probably is less than 25 per cent, and interestingly enough the greatest percentage of country dwellers is in the South where yeast raised bread is less generally used than elsewhere.

Nearly 26,000,000 people live in the territory south of the Potomac and the Ohio and east of the Mississippi and in the great state of Texas, and of this large population over 19,000,000, or 75 per cent, live in the country. The aggregate population of all the large cities of the South is less than three millions. Apparently then the widest field for the development of the baking industry is in the South. This may actually be the case but commercial baking will not supplant home baking in the South until the present dietary system of the southern home is changed, and until some better means than those now available are provided for carrying the product of the bakery to the country home.

Our Potential Markets

It is one thing to know where the market is; it is a far more important thing in the conduct of business to know that that market can be supplied with profit to the manufacturer. Already the baking industry is following false economic laws in the development of business in territory too remote from the bakery to be profitably served. The theory that increased production justifies larger and larger distribution costs is certainly deserving of critical study.

Secretary Hoover recently addressed the National Distribution Conference at Washington. He discussed the economic wastes which are the natural outgrowth of a competitive system and he pointed out that while the wastes of industry seem to be of main interest to manufacturers and distributors, in the end the public pays the

bill. He emphasized again the fact that while we have a full knowledge of production methods and costs, we are almost wholly lacking in basic data as to distribution. Our problem then is a problem in consumptionism which takes certain definite forms.

The first concern of the baker is to determine whether or not his products are within reach of every home within the radius in which he can profitably operate. Second, has this population abandoned home bread making? Third, is it using as much bread as it should? It is apparent, of course, that in this discussion I am not referring to the amazing opportunities for increasing the consumption of other baked goods than bread, of tripling the consumption of baker's cakes and pies and sweet goods, indeed, of developing the practice of dependance upon the baker to supply these important items to the home as fully as is now the case with bread.

I have said that the baker's first survey is to determine whether or not he is reaching his potential market. He must also make for himself the second survey before he knows whether or not through education and advertising he has broken down the last resistance against the elimination of baking as a duty of the home maker.

The third proposition, however, cannot be studied intelligently by the baker for it involves a field far beyond his scope. The increased consumption of carbohydrate food in the form of bread and cake can only be developed through the application of the basic laws of economics and of nutrition. The question to be answered is—Can the proportion and amount of bread in the diet be increased? Under the stimulus of war-time activities food production reached a maximum. In the years since the war, over-production of almost every farm product has been the rule, and the inevitable working of the

law of supply and demand has depressed agriculture and so injured industry.

The relief of the farmer has become our national problem. Bankers and politicians have sought some panacea by which to heal the farmer's wounds. And all the while it has been clearly evident that the only way the situation on the farm could be relieved was at the hands of the farmer himself who reduces his crop acreage, plus the assistance of the natural causes which operate to check production.

Farmer Relief Problem

This statement, however, can be modified if the consumption of farm products can be generally increased. With this thought in mind, the Farmers' National Council recently released a press statement, entitled "Domestic consumption of farm products should be increased one-half." The Harvard Business Review in commenting on this statement, pertinently asks, "Does the author of this proposition intend to convert the American home into a goose pen?" and he points out that while each of the drives under the slogans "Eat More Wheat," "Eat More Meat," "Milk for Health," "An Apple a Day," "Fish for Food," may in itself be sound, the fact remains that they cannot all succeed. Each family following the "Eat More" injunction will naturally follow the path of least resistance in the choice of the products it desires to use in larger quantities. The increase of consumption will follow taste, trade, preference and price considerations.

Where does the baker stand among these campaigns? It can, I think, be shown that he has every advantage for his product costs less than other foods, its quantity is more uniform, and the demand for it is better stabilized, it is the only food which custom places on the table three times a day.

Following the loyal response to the war-

time admonition to "Eat Less Wheat" there was a decreased consumption of flour in the form of baked products. In 1914 the per capita consumption of flour was estimated to be 1.04 barrels; in 1918 this consumption dropped to .86 barrels; in 1923 consumption was .98 barrels. Even before the war we were eating far less products of flour than people of other countries. Cheap meats, and an increasing variety and supply of fruits and vegetables have helped to cut down bread consumption.

Among the Immigrants

During the years of our greatest population increase through immigration it was noted that the bread-fed Italian immigrant reduced his bread consumption as he adjusted his life to fit American conditions. This tendency to substitute more expensive foods for bread has gone too far and in terms of calory intake has reduced the percentage of carbohydrate food, chiefly in the form of bread, to less than 30 per cent of the food intake. This figure is nutritionally and economically too low and may well be increased from 6 to 10 per cent. It may not soon be possible to increase the consumption of carbohydrate food until it makes up 40 per cent of our food intake, but from every standpoint that end is much to be desired.

How can it be done? This is a problem which the baking industry must solve for itself and it is to the solution of this problem that American Bakers' Association brings all its resources, and it is in the support of this work of the Association that the justification of organized effort in the name of the Association is to be found.

I have listed some of the hurdles the industry has to meet as it progresses along the road to increased consumption. Another most important obstacle is the increasing use of sugar. In the pre-war

period, 1909 to 1913, the per capita sugar consumption was 80 pounds. In 1913 it was 85.3, in 1921 it was 106 pounds per capita. Since then it has fallen off somewhat. Last year it was 100.3 pounds. Using that figure it is apparent that in fifteen years sugar consumption has increased 20 pounds per capita. That is a lot of carbohydrate food. It is equivalent to nearly 40 pounds of bread. In terms of flour that means 15 million barrels, or in terms of bread four billion four hundred million one-pound loaves, or the output of 325 travelling ovens turning out 3,000 pounds of bread an hour for 15 hours a day, 300 days in the year.

Since the consumption of carbohydrate food has been fairly stabilized by habit as well as by nutritional needs, the reduction of sugar consumption from 106 pounds to 100 pounds has broadened the market for bread to a very considerable degree. Using the figures I have above quoted it would appear that a diminished sugar consumption of nearly 6 pounds per capita would justify the belief that bread consumption had increased 11 pounds per capita. It is not probable that this reduction of sugar consumption has come about through any action of the baking industry. Nevertheless it is definitely recorded.

The Case for the Baker

Is it possible now through concerted effort to substitute more and more products of the bakery, consisting as they do, from a nutritional standpoint, of much better balanced foodstuffs, for pure sugar eaten in the form of candies? The desire for sugar is a natural desire, justified by the fact that sugar is very rapidly metabolized into energy which drives away fatigue and stimulates ambition. The truth of this physiological fact is daily demonstrated by the childish urge for candy. But it is also a fact that concen-

trated sugar solutions poured into a child's stomach in the form of sweet drinks, chocolate bars and all the other combinations which tempt the child to between meal sugar eating set up unfavorable conditions in the stomach which are responsible for the almost universal admonition taught the mother by every pediatrician and nutrition expert that her children should eat less sweets. And it is this admonition uttered over and over again through the years, which has established the idea that children should be given less pie and cake. In other words, the sweetened products of the bakery are classified with candy and confections in the taboo against sugar. This is an unjustifiable situation based on misunderstanding rather than on scientific fact.

The ingestion of cake or pie containing relatively a small quantity of sugar, 25 per cent at the most, is very different from the eating of confections consisting almost entirely of pure sugar and free from starch or protein or the least vestige of mineral salts or vitamins. A study of these facts convinces us that the slogans "Eat More Bread," or cake or pie, can be effectively used in any educational campaign which substitutes baker's products for sugar.

There is another and to me a very obvious way of increasing bread consumption. More than one-fourth of our population consists of growing children, these same children who are so largely responsible for the huge consumption of sugar. Surveys of the health condition of children show a surprisingly high percentage of undernourished or malnourished individuals and justify the statement now commonly made that children, whether they be rich or poor, on the whole receive too little food. Gephart, who studied the food intake of growing boys, found that they required as much food as a Maine lumberman, nearly 5,000 calories per capita.

Miss Roberts, an investigator at the University of Chicago, in a recent address before the Chicago Chemical Society, reported unpublished data showing that little children 4 to 6 years old needed far more food than they were getting and in some cases almost as much food as adults. Is it not the baker's business to furnish this food for the better nourishing of childhood? It, of course, does not suffice to say "Eat More Bread" to a child. Fortunately there are easy ways in which to increase the consumption of bread among children. We have only to put a fourth meal into the child's ration.

Recess School Feeding

Recess school feeding is an accomplished fact in a large number of our schools. We know that children who are given a bottle of milk at recess make better students and grow more rapidly than when they are not so fed. We know, too, that a luncheon of bread and butter, or of bread and jam after the school day is over, gives the child the extra foods he needs. This should be the fourth meal and this form of after school feeding should be the universal practice in every home. Unfortunately that is not the case today. There is a taboo against the between meal feeding, originating perhaps in the desire of overworked mothers to keep children out of the kitchen.

But whatever the cause, we have all heard the admonition, "Don't feed children between meals. It dulls their appetites and upsets their digestion." We have every reason for believing that these statements are unsound. We know that our children need more food. It is the business of the baking industry to see that the fourth meal is added to their ration.

And there is still another way in which the baker can build a larger market. I have already given definite figures show-

ing the trend of population toward the cities. Every family which moves from the country districts of the South to Chicago enlarges the market for bread, and what is true of Chicago is true of every city and of every growing town whose population increases at the expense of the rural districts.

But in addition to the broadened market, due to the transfer of population, every year definitely adds new bread consumers to the ratio of the excess of births over deaths. The last Census Bureau report shows a death rate of 11.9 per thousand and a birth rate of 22.5 per thousand. During the record year the number of bread consumers naturally increased 846,000. You wonder how any action by the baker can broaden his market beyond the limits determined by the excess of births over deaths.

Unfortunately a large number of the babies are not alive at the end of the first year. Infant mortality is a tremendous burden which is felt not only in the desolated home, but by every industry. While the total death rate is less than 12 per thousand, the infant mortality is 80 per thousand, and in many parts of the country is more than twice that high figure. Infant mortality should not be over 40 per thousand, in fact, it is below this figure in certain well favored sections of the country.

Building Our Foundations

If then, infant mortality could be reduced from 80, the figure now obtaining in large cities in the birth registration states, to 50, a direct saving in potential bread customers would be made of 58,000 per year. This is the population of a good sized city. It is a population which would well support many bakeries. Does not the baker then, for purely business reasons, have a direct interest in the child welfare and can he not in his building for

the future discuss mortality tables as they affect children just as profitably as he can the increase of consumer population due to the development of a new residence addition or the building of a new factory?

Such constructive work as this is indeed the building of foundations on which the baking industry of the future must rest. Without in the slightest degree minimizing the fundamental truth that the way to increase bread consumption and cake consumption and pie consumption is to make better bread and cake and pie, we must thoughtfully take cognizance of the fact that after we have satisfied the appetite appeal of the consumer by the development of the best possible products; after we have thrown around our goods in the course of manufacture and in distribution every sanitary precaution; after we have developed methods of distribution coupled with and assisted by the highest type of advertising and salesmanship; and after we have torn the pages devoted to bread and cake baking from every cook book and eliminated home baking from every kitchen, we have still before us a potential market limited only by our ability to increase the consumption of baked goods by raising our carbohydrate intake from its present low level.

This is the most important work ahead of the baking industry. This is the reason American Institute of Baking exists. This is the objective to which we have set ourselves. We shall not reach it in a year or in a decade, but all the time we shall be working toward the goal and all the time we shall know that every critic of white bread answered, every stout woman convinced that slenderness does not depend on eliminating bread from her diet, every pound of candy placed beyond the reach of sugar lovers, every bread and butter sandwich fed to hungry children, is a definite measure of our progress.

There is no baker working in his office

or toiling in his shop today who cannot help the industry attain this goal. Will he see this problem as we see it and will he throw his influence behind our common cause? If he is clear visioned he will see his future markets opening before him. If he is clear minded he will plan the ways by which he can help his industry the sooner to reach its goal. If he has a loyal heart he will join his fellow bakers in their work of developing this, the fundamental food industry. And all this is the reason for American Bakers Association.

Editors Please Note

GANYMEDES exclaimed, "You people gabble away with things that don't concern heaven or earth; and none of you cares how the price of grain pinches. I couldn't even get a mouthful of bread today, by Hercules, I couldn't. If the damned grafting officials would only get what's coming to them! They work with the grafting bakers and graft with them. That's the way it always is, the poor devils are out of luck, but the jaws of the capitalists are always keeping the Saturnalia. If we only had such lion-hearted sports as when I first came from Asia! That was the life! If the flour was not of the best they would beat those belly-robbing grafters till they looked like Jupiter had been at them.

Provisions were cheap in those days. The loaf you got for a nickle, you couldn't eat, not even if someone helped you, it was that large. But now the loaf you get is no bigger than a bull's-eye, and the worst of it is such things are getting worse every day. What gets me is that I've already eaten my old clothes, and if this high cost of living keeps up I'll have to sell my cottages! May I never have any luck if I don't believe this all comes from the gods; the gods have the gout

now because we are not religious. No one thinks that heaven is heaven, no one keeps a fast, and no one cares a hang about Jupiter; they all shut their eyes and count up their own profits!

No, gentle reader, the above is not from a speech of Senator Capper capitalizing farmer antipathy to the baker and the miller, and accusing both. It is from the writings of Petronius, who was a Roman official under Nero in the days when Rome was strong and all the rest of the world was very weak.

Educating Them

URGING people to eat whole wheat bread is very different from pillorying the bakers for not baking what they have been unable to sell. "I have just received a card from a lady," writes Dr. Harvey W. Wiley, "who was in the audience when I delivered an address before the Open Forum at Daytona, Florida, from which state I have just returned after a little missionary work. It reads: 'I am sure you will be pleased to know some of the results of your splendid health lessons recently given in Daytona. One baker told me that it is almost impossible to supply the demand for brown bread.'"

To Dr. Wiley that spells progress in his crusade but the saddened baker who has let himself be lifted up in the enthusiasm for whole wheat bread and then has fallen into bankruptcy with the consumer desertion of the fad after a short trial, will want to know how many of those enthusiasts come back the second week, the second month, the second year.

A Chicago baker who believes in whole wheat bread with all his heart, and eats it exclusively has fought for two years to make his customers like it and accept it. He has won—in a measure. He is able to sell them 450 whole wheat loaves to each 18,000 loaves of white bread.

American Research

IN connection with the cost of food and its nutritive value, a great deal of awful rot has been written, much of it by cranks, but some of it by people genuinely interested in the question; unfortunately, in this as in many other matters, the seeker of knowledge usually finds the kind of experience he is looking for, and if this seeker happens to be a man of some eminence in the medical world, and even if he doesn't happen to be eminent at times, his words are accepted as meaning far more than they should. In this connection the enquiries or research into food values at present being carried out by the American Institute of Baking should be of considerable interest to us. The American Institute of Baking is somewhat on the lines of our own National Bakery School, but more work is done in the way of research. Last year our National Association adopted the very sane plan of employing the talent at the School in research, and some considerable progress has already been made in the very short time the scheme has been in existence; in the American Institute they have gone into the matter in a bigger way, and, as is the case in some of our universities, feeding experiments are conducted on live animals. At the time of writing it has been found at the Institute, by experiment, that even pure butter, if given to a rat, will kill the animal faster than the much maligned white bread. Until recently the baking trade had to take its science at second hand from other researchers, but there seems to be no special reason why it should do so. I don't hold up America as an example to this country in the way of conducting research, but I do say that the American plan of the baking trade getting its own information is a very good plan indeed; it may merely be a case of confirming other research

work, or it may, on the other hand, be the important matter of proving some (shall I say?) theories wrong; in any case it is the trade's own information, unbiased by the influence of manufacturers or medical researchers, looking for things to back their own opinions.

—Observer, in the British National Association Review, London, England.

Cooperation in Action

Recently the California Walnut Growers' Co-operative Association sold 96 per cent of the entire crop of California walnuts in 48 hours. The managers in charge surveyed the American market and found the crop 5 per cent short. It held back until the holiday demand made buyers acutely in favor of speedy action. Then the whole crop went at one auction sale. The price was above 30 cents per pound. Five years ago this crop was sold through commission merchants who cared little how it was stored and delivered a worm-eaten, unfit product that unsold consumers faster than advertising could ever build up a buying morale.

I read nearly the entire contents of the American Institute's September bulletin aloud to Mrs. Grant, and we both enjoyed what we read very much. I was somewhat familiar with the life of Pasteur while a boy, but I was certainly astonished to read in your "Romance of the Holes in Bread," of the scientific opposition he developed after he had practically demonstrated his position time and time again by actual scientific tests. It is really astonishing that Pasteur should have had to meet such opposition, but I do not know why I should feel surprised when I know that all advance in science, art, and invention along any line is opposed by a majority of mankind.

—From a letter from Heber J. Grant,
President of the Mormon Church.

Composition of Milk Bread

Recent Analyses made at the Laboratories of the American Institute

By C. B. MORISON

THE word bread is used without qualification in popular speech and writing to denote a rather extensive variety of baked products made from ground cereal grains and other farinaceous materials. Leavened and unleavened products which are quite unlike in their characteristics and nutritive properties are all designated as bread.

In a more restricted sense of the word, "bread" means wheat, or white bread, leavened with yeast and is so recognized in F. I. D. 188, published by the Secretary of Agriculture as a guide for the use of officials in the enforcement of the Food and Drugs Act.

The word bread is thus defined according to popular usage, but it is also stated that "In the United States the name 'bread' unqualified, is understood to mean wheat bread, white bread." Standards and definitions are then indicated for wheat or white bread dough, wheat or white bread, rye bread, raisin bread and brown or Boston brown bread.

These standards and definitions formulated primarily for the guidance of officials of the Department of Agriculture in the enforcement of the Food and Drugs Act, are also of fundamental interest to nutrition workers, dietitians, physicians, and others, as a basis for the comparative discussion of the nutritive properties of definite kinds of bread.

It is now fairly well appreciated by most people that generalizations on the nutritive properties of bread and its place in the dietary cannot be based exclusively on the mere results of chemical analysis, digestibility coefficients, and the calcula-

tion of energy values or calories. The results of animal feeding experiments with different kinds of bread have shown increased nutritive properties in relation to the kind and amounts of supplementary ingredients, as for example milk and yeast. It is therefore unsafe to generalize on the food value of bread unless specific reference is made to the kind of bread under discussion.

Compilations of bread analyses commonly found in food literature do not generally indicate the kind and amount of the ingredients of the formula, other than the grade of the flour, and "it is difficult," as H. W. Wiley has stated, "even from a large number of analyses, to determine what is the composition of the typical classes of bread used in the United States. The most valuable data of this kind which can be obtained are those secured by actual baking experiments."

The conventional proximate analysis of bread states the percentages of foodstuffs; water, protein, nitrogen free extract, crude fibre, fat, and ash. This is sufficient for quantitative applications and the calculation of calories, but it is obviously lacking in information as to the quality of the proteins, the presence of vitamins, and essential inorganic constituents. If, however the statement of analysis includes information as to the specific kind of bread analysed, on the basis for example of F. I. D. 188, with additional data on the grade of flour, the amount of milk or other supplementary ingredients, and the determinations of calcium and phosphorus, a much more satisfactory inter-

pretation of the nutritive properties of the bread is made possible.

The following results were obtained from the analysis of a series of eight loaves of bread made in the Institute laboratories from a standard baking test formula mixed, fermented and baked under similar conditions. The only ingredients varied were the dried whole

shortening. The amounts of dusting flour used were kept as near constant as possible. The flour was weighed to 0.1 gm. and the other ingredients to 0.001 gm.

Table IV shows the results of the analysis of milk bread made with dried milk and liquid whole milk respectively. The ingredients of the formula other than the milk were the same.

Table I.—Analyses of Milk Bread

	No Milk	Original Basis %						
		2.5% Milk	4.0% Milk	5.5% Milk	7.0% Milk	8.0% Milk	9.0% Milk	10.0% Milk
Water	36.09	36.47	37.46	37.21	37.15	36.66	37.72	37.39
Protein N X 6.25.....	8.88	9.18	9.10	9.19	9.40	9.53	9.43	9.54
Nitrogen free extract..	51.03	50.01	48.79	48.55	48.25	48.27	46.98	47.06
Crude fibre.....	0.17	0.19	0.19	0.19	0.16	0.22	0.19	0.18
Fat	2.42	2.70	2.98	3.37	3.53	3.76	4.14	4.25
Ash	1.41	1.45	1.48	1.49	1.51	1.56	1.54	1.58

Table II.—Analyses of Milk Bread

	No Milk	Dry Basis %						
		2.5% Milk	4.0% Milk	5.5% Milk	7.0% Milk	8.0% Milk	9.0% Milk	10.0% Milk
Protein N X 6.25.....	13.90	14.45	14.55	14.64	14.96	15.05	15.14	15.24
Nitrogen free extract..	79.83	78.72	78.02	77.32	76.77	76.20	75.44	75.16
Crude fibre.....	0.27	0.30	0.30	0.30	0.25	0.35	0.30	0.29
Fat	3.79	4.25	4.76	5.37	5.62	5.94	6.65	6.79
Ash	2.21	2.28	2.37	2.37	2.40	2.46	2.47	2.52

Table III.—Calcium and Phosphorus

	No Milk	Dry Basis %						
		2.5% Milk	4.0% Milk	5.5% Milk	7.04% Milk	8.0% Milk	9.0% Milk	10.0% Milk
Calcium	0.016	0.045	0.059	0.069	0.090	0.097	0.111	0.119
Phosphorus	0.141	0.156	0.160	0.173	0.183	0.185	0.190	0.193

milk powder and the water. The first sample contained no milk, and the others 2.5, 4.0, 5.5, 7.0, 8.0, 9.0 and 10.0% respectively on the basis of flour as 100%. The water was varied in proportion to the amount of milk used in order to maintain the proper consistency of the doughs. The flour was a representative Northwestern spring patent, the dried whole milk was Parlac, Merrell-Soule Co. The only other ingredients were yeast, sugar, salt and

Table IV.—Analyses of Milk Bread

	38% Moisture Basis			
	2½% 8%		All ½ Milk	Milk
	Dried Milk	Dried Milk		
Moisture	38.00	38.00	38.00	38.00
Protein N X 6.25....	9.05	9.49	8.97	9.46
Nitrogen free extract..	47.89	46.90	48.43	47.51
Crude fibre.....	0.17	0.16	0.22	0.22
Fat	3.44	3.85	2.81	3.20
Ash	1.45	1.60	1.57	1.61
Calcium	0.044	0.067	0.050	0.080
Phosphorus	0.093	0.115	0.087	0.101

A representative hard spring wheat patent flour was used which contained 11.50% protein (N X 5.7) and 0.43% ash. The liquid whole milk contained 12.30% total solids so that the milk solids introduced into the formula from this source was 2.7% and 8.00%, respectively. The other ingredients were sugar, malt extract, shortening, yeast, commercial yeast food and salt in the usual proportions of a representative commercial formula. The amounts of calcium and phosphorus calculated from the determinations of calcium oxide and phosphorus pentoxide were somewhat higher than those shown in Table III. This increase was due largely to the commercial yeast food which was absent from the laboratory baking formula.

The methods of analysis used were based generally on those of the A. O. A. C., but at present official methods specifically intended for application to bread are lacking. The protein was calculated from the Kjeldahl nitrogen determination employing the factor 6.25. The use of this factor instead of 5.7, which is official for wheat flour, was used for the calculation of bread protein, because there are other sources of protein in bread than the wheat flour. This condition is especially apparent in milk bread.

Many published bread analyses, especially the older ones, are often low in fat, because this constituent was determined by direct ether extraction, which does not entirely extract the fat from materials such as bread. The determination of fat or total lipid material is more satisfactory when made by a modified method. This consists essentially in the treatment of the ground bread with alcohol, ammonia, water, and heat; followed by extraction of the treated material with successive portions of ether, collecting the filtered solvent in a tarred flask and finally evaporating the ether. The fatty or lipid

residue is then weighed after drying to constant weight.

The analytical work reported was performed by Messrs. Luckow and Gant.

True Economy

HOME SERVICE DEPARTMENT

Matthaei Baking Company

Mary J. Brown, Manager

Tacoma, Wash., Jan. 28, 1925.

Dear Madame:

I find that many women have the idea that it is more economical to bake their bread than to buy it.

I think I have convinced you in my previous letters that no bread, home-baked or otherwise, could be more wholesome, pure or nutritious than Matthaei's Honey Bread. And I am sure a moment's thought will convince you that it is also much more economical than the home-baked loaf.

I have heard women say, "The baker must make a profit and I can save that profit if I bake my own bread."

The baker makes a profit, to be sure. If he did not, he would not long be in business. But he makes it by buying all of his materials in very large quantities and, accordingly, at much lower prices than you pay; by selling thousands of loaves, each at a small margin of profit; by keeping up the heat of his ovens constantly and by making and baking his bread with scientific accuracy in every step of the process, so that he has no failures.

The result is that the modern, scientific baker can sell you a better loaf than you can make in your range oven, at a fraction of your cost, when you figure in your materials bought in small quantities and your fuel, to say nothing of your labor or your time.

Why not be free of the drudgery of home bread-baking, especially in a city

where a bread like Matthaei's Honey Bread is obtainable? Why not have the time for other things—for your family, your children, or for self-improvement? Perhaps it is your husband who thinks home baking an economy. If so, will you not read to him this letter and any of my previous letters which you may have kept?

What is true of bread is equally true of other baked products and I want to tell you in my next letter of the great diversity of things turned out by the Matthaei bakery.

Insist on Matthaei's Honey Bread—there is a difference in bread.

Very sincerely yours,

MARY J. BROWN.

—From a series of Matthaei letters to housewives on educational themes.

Art and Baking

Do you remember away back when street-car cards were hideous and bill boards were worse and electric signs were a constant affront to the eye? In those days an artist who had any reputation scorned commercial work and struggled to get in the center page of some magazine like *Life* with his art work.

The commercial artist was despised. Then came some industrial leaders who felt that art could decorate industry as well as social life, and they paid the best of the illustrators to make art out of industrial themes. The car cards became things of beauty. Bill boards became easier to look at. Electric signs flared pleasantries at the eye instead of hideous distortions. And the merest of beginnings only has been made.

"I am thoroughly convinced," writes Paul Schulze, who is known through the Middle West for his love of art and his fine art collections, that a love for art will help a baker build up his business, and will serve him to win confidence from the consuming public."

Bakery Engineers

AT the Hotel Sherman, Chicago, there will assemble on March 9 the members of the organization formed a year ago by production managers of bakeries and called "The American Society of Bakery Engineers."

At this second annual meeting the Society will take up the discussion of production problems where it was left off a year ago. On Monday Thomas E. King will lead a discussion on costs and accounting. A theater party following a dinner party will fill up the evening hours.

On Tuesday morning C. J. Patterson of Kansas City, Mo., will lead a discussion on materials, while Fred C. Riechert of Indianapolis will lead a discussion on organization and personnel. On this evening a dinner dance will be the entertainment feature.

On Wednesday the discussion leaders will be G. Cullen Thomas, and W. E. Doty, both speaking on equipment. Thursday will be given over to a summarizing of all discussions and the opening of a question box.

Of Service

So many people ask why an Institute of Baking is in any way essential to the baking industry that it is pleasant to record letters from the far corners of the earth directed to this common center and home of our industry. "We conduct both day and evening classes in flour milling," writes Thomas W. Powell, librarian of the Battersea Polytechnic of London, England, and therefore we would like your bulletin on the relation of diastatic enzymes to flour strength by Dr. L. A. Rumsey and on flour strength as influenced by the addition of diastatic ferments, by F. A. Collatz."

Our American Pie

*It is a Typical American Dish, Developed by Our Puritan Ancestors
in New England*

By ROSCOE H. SHAW

Department of Nutrition, American Institute of Baking

HERE'S all 'ot—toss or buy! up and win'em'' was the familiar cry on the streets of old London as the street vender of pies plied his savory trade. In those old days—forgotten except for the tales handed down to us by writers of old London life—pies were for the most part sold on the street. Custom, especially among the young folk, was not to tender a penny and receive a pie in return, but rather to toss the penny. The pie man yelled "heads" or "tails" while the coin was in the air and if the possessor of the penny was playing in luck, both the penny and the pie were his. However, if, as was more often the case, luck was against him, he lost his penny and had no pie. The pie once obtained, was rendered delectable when after a hole had been made in the crust with a deft jab of the little finger, hot gravy from an oil can was poured in by the pie man. Then the feast began. Tales come down to us that it was not only the small boys who "tossed" for pies in those days but that it was a favorite sport with older ones who had spent the early part of the night in the public houses. The difference here was, however, that instead of being eaten, the pies as well as the pennies were "tossed" somewhat after the fashion that made a certain movie comedian of English birth famous in this country.

Although pies are of very ancient origin the fruit pie as made in this country is a typical American dish. The sort of pie sold on the streets of old London more than a hundred years ago was usually a

meat pie and differed in no material way from our meat pies of today. The crust, always on top, was made of biscuit dough rather than of the pie crust we use for our fruit pies. Fruit pies came into popularity about that time but they were not made the American pie with a double crust, but more like tarts having an under crust with a ridge to prevent the juices from running out.

Pies, while never lacking in popularity, have not been regarded by some as being particularly digestible. It has been claimed that the presence of fats in the crust renders it indigestible on the peculiar theory that it prevents thorough cooking. Others claim that the crust soaks up the juices and becomes soggy, which also impairs its digestibility. In short, in common with many other things that we like, prejudicial stories have been circulated about pies. They have not been accorded the clean bill of health which they deserve.

Recent investigations have shown that these old prejudices are quite without foundation. Dr. Langworthy of the Department of Agriculture in Washington recently showed that raw wheat starch is just as completely digested as is cooked starch, and this is 100%. So even if the starch is not thoroughly cooked in pie baking, which is not the case when they are well made, it would make no difference with its digestibility. Dr. Deuel, an associate of Dr. Langworthy, recently made a study of the digestibility of some of our common foods and found that

99.5% of the starch in pie crust is digestible, this figure being the highest in the list of foods studied, which included 16 article such as rolls, yeast biscuit, sugar cookies, crackers, etc.

Digestibility Not Difficult

Dr. Hawk, until recently professor of physiological chemistry at the Jefferson Medical College of Philadelphia and one of the leading authorities on nutrition, in reporting what were perhaps the most elaborate studies ever made on the digestibility of foods, states: "Pies with crust, if properly made, could by no means be classified as difficult for the stomach to handle." So it is evident that modern science has made out a pretty good case for pies.

Pies are real foods. The crust contains proteins, fats and carbohydrates. The food value of the filler naturally varies according to its character. The apple pie is perhaps the most popular of all pies. As Whiting in a recent article in the Boston Herald on "Pies in New England" puts it: "This pie has all the necessary equipment for steady use. It is of good flavor, nourishing, offers just the right resistance to the teeth, and is good hot and good cold."

Well Made Crust

The kind of pie typified by the custard pie, which includes the squash, the pumpkin, the sweet potato pie and others, is very high in food value on account of the eggs and milk used in the filler. Taken altogether this type of pie comes about as near meeting our body requirements as any single article of food. The proteins of the egg and the milk supplement those of the crust, supplying the variety as well as the quantity of the proteins we require to build up and maintain our body tissues. The carbohydrates are of course represented by those of the flour, the sugar added, and the lactose of the milk.

Fats are supplied by the shortening in the pie crust, the butter fat in the milk, and the fat of the egg yolk. The necessary mineral salts are supplied by the milk and egg, which are also among the best sources of vitamins.

A well-made pie crust must be flaky and porous. The art of making this kind of crust is not easily acquired and failures are often discouraging to the young cook. The modern commercial pie baker has machinery at his disposal that incorporates air in the pie crust dough much more thoroughly than is possible by hand. In the larger pie bakeries are to be found enormous cold-storage rooms that keep the berries and fruits used for pie filling in a frozen condition until wanted. This is well illustrated in the case of strawberries. These delicate berries are gathered in season and immediately frozen. In this condition they remain unchanged until perhaps mid-winter when they are carefully thawed out and become the filling for strawberry pies in every way as delicious as though made in June or July from berries right off the vines. Thanks to the modern pie baker our tastes for fresh berry or fruit pies may be gratified at any time and are not limited to the season of any particular berry or fruit.

Our Ideas Changing

Our ideas regarding the feeding of children are changing. Play to a child is work, often hard work. He needs food for the dual purpose of supplying the essentials for growth and for energy. It is realized now that the child needs food more often than adults. The lunch at recess and after school is coming into vogue. There is a natural craving for sweets in childhood. Concentrated sweets such as candy have been shown to irritate the stomach. How can this craving for sweets be more judiciously met than by well-made pies?

Raisins' Message to Wheat

Head of California Growers' Association Tells How Grain Farmers Could Improve Baking Outlet for their Product

By RALPH P. MERRITT

General Manager, California Raisin Growers' Association

Why do farmers who grow ingredients for bread other than wheat know the baking industry so much more thoroughly than the wheat growers? Why do the wheat growers seem to be forever throwing brickbats while the fruit growers, for instance, study the baking industry intently to find better ways to make bread a carrier for fruits? The Hawaiian pineapple growers, the California fig growers, the walnut growers, and the raisin growers are doing just that. And all these producers of food are farmers organized with a unified headquarters. The wheat growers, on the other hand, are the prey to the ignorance of alarmist editors and political advocates who live by exciting prejudice rather than spreading light. One fruit growers' association now puts into bakery goods thousands of tons of its product where formerly baked goods were only a carrier for a small amount. With wheat-grower understanding and team work, the bakers of America could put 200,000,000 more bushels of wheat into consumption in America than are now used. But where wheat growers are needed with leadership there is as yet no means for its expression. We asked the president of the farmers' association which watches our industry intently as a potential carrier of its product what raisins' message to wheat might be. Here is his reply.

WILL the time ever come when the wheat farmers of America see the bakers of bread and sweet goods as the real passers-on to market of their wheat? Once the growers of California fruits were so blind that they thought of "sales" as the passing of their goods to commission merchants or jobbers. After that they forgot about the matter and went to the raising of more crops. But that was away back when total sales were a mere titling of sales now made in this era when sales are measured in the units of a whole crop.

The fruit grower had to learn that an ounce of cooperating help was worth a great deal of back-fire, and that no sale was a real sale until it marked the passing of goods into consumption. We often hear that America eats lightly of wheaten foods. The war put a "stop" on them and created habits such as the habit of providing 2 ounces of bread to an order in dining cars and hotels and restaurants. Pressure from great farmers' organizations could rectify these matters and get

consumption habits back to their pre-war basis, as wheat production is. If wheat were handled as raisins are those in charge of the wheat men's organizations would be watching jealously for every chance to promote the cause of the baking industry. Certainly they would know the industry and its personnel. There would be no standing off across the lot in disdainful quibbling.

I am asked by Baking Technology to tell the story of how our cooperative efforts were worked out and put into action. We can certainly say for them that we called in practical bakers first and took their advice, and did not try to give them advice before we knew their industry.

We recognized the bakers as manufacturers and that baked bread and sweet goods had a very different cost relationship to wheat from what, for instance, retailed potatoes did to farm-held potatoes. So that merely crying that the producer did not get a fair share would do no good. We had to learn the prob-

lems of the user of wheat who manufactured baked goods from it.

How well our methods succeeded may be judged from an increase in 12 middle western cities from 21,231 loaves per week to 43,184 loaves per week. Perhaps our organization's personnel knew as much about what consumers thought about raisin bread as the bakers did who put it out for us. We learned long ago that we must work with the baker's customers and do all we could to adjust his methods to their wishes and demands. The American Institute itself could not be more alertly interested in the conditions within the industry than our personnel is. An increase of 50 per cent to 1,500 per cent over the former use of our product with bread as the carrier tell us how, knowing the bakers and their customers have paid.

What was our plan of procedure? First, we went to the bakers with a carefully prepared synopsis of what we proposed. We talked over the plan with many individual bakers and convinced them that the plan properly backed by nation-wide advertising meant more money, not alone for the raisin growers, but also for every baker who put out a good quality raisin loaf. We established a feeling of harmony and understanding between the bakery trade and the raisin growers.

The manufacturer or the industry which looks upon the bakery trade merely as an outlet to get his product sold to the consumer and who selfishly refuses to consider the interest which the wholesale or retail handler of his products has in the distribution of the manufacturer's product, is placing himself in the same position as the "one-time salesman."

Every group of agriculturists who are trying to win the good will of the bakery trade will do well to repeat just what the raisin growers did when they started out

to make bread a carrier for their product. Naturally, the growers first considered the possibilities of bread as an outlet through which a large tonnage of raisins could be moved. They analyzed this outlet to find out whether they could expect to make a reasonable profit for themselves out of raisins which were used by the baking trade.

But like every successful merchant we also looked upon the proposition from the other side of the fence. We studied the bakery trade to find out whether or not the baker himself could expect to make a fair profit out of the selling of raisin bread.

Then having decided that such bread could be sold at a profit both for themselves and to the bakery trade the raisin growers started out to find the best plan by which to bring the situation forcefully to the attention of the public.

The raisin growers planned an advertising campaign which would appear in newspapers and magazines and would cost half a million dollars within a period of eight months. Every penny of this money was to be spent in order to create a consumer demand, which would help bakers to sell this bread regularly every Wednesday.

But the raisin growers went even further than to give the baking trade a successful sales idea plus an advertising campaign. We employed a corps of experienced bakery service men to travel among the baking trade and show the bakers the best way to make a quality loaf.

We perfected an entirely new pack of both Thompson seedless raisins and seeded Muscat raisins which was particularly adaptable for the newly developing use. These new packs were put up in a way which permitted them to be priced so that it would be possible for every baker to use a generous supply of raisins in every batch

of bread he made. In other words we studied bakery problems and packed for the baker's maximum convenience.

An experienced bakery man was sent out from our head offices to visit bakers in all parts of the country and to explain to them the association's plan for popularizing our product as baked into bread and at the same time co-ordinating the work of our service men. This man could talk to the bakers in their own language and showed them exactly how they could tie in with our proposed campaign. This man answered questions which were brought up by the bakers he called upon, corrected any misunderstandings which might have existed between the growers and the baking industry in the past and established a basis of a confidence on the part of the bakery trade for the growers which was the foundation of the tremendous success we now enjoy.

Light Use a Failure

As soon as the campaign began, we found that some bakers were finding a ready sale while other bakers were selling only a few loaves and were not making any progress in developing a consumer demand. The truth soon came to light. The bakers who were not selling their raisin bread were found to be using only about one-half the amount of raisins which were being used by the successful raisin raisin bread a week.

Our bakery service man using this information which we had gathered all over the country, called the attention of the bakers to this fact and pointed out to them that raisin bread which was full of plump, full-meated, juicy raisins was an easy and profitable seller, while raisin bread which had only a few scattering pieces of raisins in each slice was a poor seller and sometimes stayed on the baker's shelves until it had to be thrown away.

One of the most prominent bakers in

the East, starting out to make raisin bread last fall, used only 45 pounds of raisins to every barrel of flour. The result was a few scattering specks of raisins in each slice of bread, and some slices didn't have any raisins in at all. Of course, he couldn't sell this kind of a loaf.

This baker started to experiment. First he increased the amount of raisins from 45 pounds to 55 pounds for each barrel of flour he used. Still his raisin bread sales were not satisfactory. Then in turn he tried 65, 75, 85 and 100, and at last 120 pounds of raisins to each barrel of flour. He found that by using from 120 pounds of raisins to a barrel of flour, he could sell ten times as many loaves as he could by using 50 pounds to the barrel of flour.

Thirty Raisins per Slice

During his experiments this baker went even further to find a perfect loaf of raisin bread. He not only carefully measured the amount of raisins used with each barrel of flour, but he cut up a certain number of loaves out of each baking and counted the number of raisins in each slice of bread. He found that the best loaf should contain from 25 to 30 separate pieces of raisins in each slice.

Then having found what he considered the most perfect loaf he could bake, he went out to get as much of the raisin bread business in his territory as he could cover. He ran regular advertisements in his local newspapers. He used extra large space on Wednesday featuring "Wednesday Special" raisin bread day. He put demonstrators in the stores who toasted raisin bread and served it with a small cup of tea to every customer who came into the store. Today this baker, who a year ago was not making a single loaf of raisin bread is baking 25,000 loaves of bread a week.

This baker worked out his raisin bread problem for himself. But many smaller

or less experienced bakers were unable to do this. They had to correct the mistakes they were making by learning how other bakers had corrected the same mistake. This was where the expert bakery demonstrators of the raisin growers helped them out.

We have tried to show that service and co-operation are the key stones of the success which we have had during the past year in securing the aid of the bakery trade in putting across our campaign.

We are so firmly convinced of the value of more and better service to the bakery industry that this year we are going to make our bakery experts, who have been calling on the trade in the past in the double capacity of demonstrators and salesmen, purely service men.

What we have done through winning confidence with our policy of service and co-operation, any farmer's co-operative organization can do. The baker, we have found from experience, is always more than willing to co-operate and meet half-way a grower or manufacturer who has a worth while product.

As Seen from Without

IN a recent publication of the U. S. Department of Commerce, H. E. Howe discusses the remarkable progress which industrial research has made in the solution of the problems of the conversion of raw materials into manufactured products. As an illustration of the successful operation of research laboratories by Trade Associations, he writes:

"An outstanding example of the influence of science upon a long established industry is to be found in the American Institute of Baking, which is one of the major activities of the American Bakers' Association. The Institute is the outgrowth of an idea supported by one or two individuals who had learned from per-

sonal experience what applied science could do for their own business activities. The question of establishing a research laboratory for the industry itself was brought forward, and from a modest beginning the Institute has now advanced to the place where it owns a building, is giving short courses for those either in the industry or about to enter it, performs a plant-problem service, and conducts research on problems fundamental to baking. A bulletin on the technology of the business is being issued, and support has come to the project in such volume that a broad program has been made possible and is being put into effect.

"This experience of the bakers is even more interesting since by far the majority of commercial bakers would consider themselves unable individually to afford a laboratory or any form of expense which might be considered overhead. Of the 26,000 bakers, only 7,560 bake 50 barrels of flour per month, 2,500 bake 200 barrels per month, and one baker requires 1,000,000 barrels a year. Through the co-operative effort in which they are now engaged, the industry as a whole is able to avail itself of new principles and methods which would otherwise be impossible."

This is only one of many examples of how the Institute looms up from without our industry. But how is it among bakers in your town? Members of the staff are often twitted with the charge that bakers speak lightly or scoffingly to visitors about it, if at all.

Some Pies—and Others

I am a great lover of good pies but most of the pies that I eat, or try to eat, are so fearfully and wonderfully prepared, and so terribly baked, that all I do is to scrape out the innards, which are usually edible, and avoid the wrapping which is usually inedible.

—Harvey W. Wiley.

Efficient Bakery Lighting

It Assists in Cutting Down Accidents and Spoilage

IT has been well said that light in an industrial plant is equally as valuable as space. That lighting is of fundamental importance is no longer disputed. Considering the fact that only five hours is the daily average of usable daylight throughout the year, for working purposes, it is of necessity that artificial lighting must take an important place in efficient plant management.

Every bakery operator does as much work with the eyes as with the hands. Since good lighting is in reality a working tool—an aid to the physical and mental condition of the operator, it should be treated as such, instead of being very much neglected as is the case in a great many bakeries.

Natural lighting in modern plants is obtained by the use of large window areas, carefully designed to obtain the most efficient lighting conditions. In a great many cases, the same care is not taken in the layout of artificial units.

Correct Lighting Increases Profits

It is interesting to note the report of Professor Clewell of the University of Pennsylvania, who, as an authority on industrial lighting, states that the average results of his observations on correct against incorrect lighting show approximately 12 per cent increase in production, 25 per cent decrease in spoilage and 25 per cent reduction in preventable accidents.

Good lighting does not mean only the installing of efficient lighting equipment, but embodies to a very great extent the maintenance and cleaning of this equipment, which can be compared to the maintenance and oiling of an engine or any part of the plant machinery.

It is not suggested from the foregoing that every baker who has bad lighting conditions should tear down his present equipment, which may have been installed several years ago, and replace it with modern equipment.

We do maintain, however, that where the lamps and shades, or reflectors have not been cleaned for months, there is a loss by this neglect alone of between 12½ to 25 per cent in light intensity. Three lights, representative of varying degrees of dirt accumulation, tested out before and after cleaning, revealed the following:

C. P. Before Cleaning	C. P. After Cleaning	Percentage Increase of Light Intensity
8	9	12½
5	6	20
8	10	25

In making the tests the light intensity was measured by a foot candle meter, thus eliminating all guess work. The foot candle meter measures light in the same practical way that a foot rule measures distance, being equivalent to the intensity of a standard candle on a surface 12 inches square, placed 12 inches away from the light source. (The loan of one of these instruments can be made from any lighting company).

In many instances where the diffused indirect type of lighting equipment is used, higher powered lamps are installed than are necessary owing to the equipment not being kept clean. Long before the life of the lamp makes necessary a change, unless the equipment is kept clean, the high powered lamp is only giving a light intensity equal to that of a lamp on the average of about 30 per cent less power. The current saving alone through cleaning of fixtures can be esti-

mated at 30 per cent—no small item in the average plant.

While dealing with diffused lighting it is well to state that although this type has a more pleasing appearance and eliminates glare and shadows, its use is not economical. From observation, the restriction of intensity of light by the use of a diffuser is approximately $33\frac{1}{3}$ per cent.

Two systems of lighting have been experimented with in the Institute plant—general lighting and individual unit lighting.

The general lighting system has been adopted owing to its cheaper installation and maintenance cost, and more even distribution of light. Through proper arrangement, the same intensity of light is obtained as with the individual unit system.

In most cases the side rays of the general lights take care of the mixers, although owing to the heavy angle shadow cast by the top cover plate made it necessary to place an individual light in one or two instances.

Reflectors Intensify Light Rays

So far, this discourse has taken for granted the general use of reflectors, but there are many who do not appreciate the use of reflectors, or shades, as they are commonly called. A reflector is now adopted universally as increasing the efficiency of the lamp or obtaining more value for the money paid for the electricity used, inasmuch as it intensifies and directs the light rays from the lamp.

The amount of intensity and the direction of the light of course depends upon the type of reflector used and can be illustrated by comparing the difference in effect by that of a lamp without a reflector and one with a reflector. In the first case, one-half of the light is wasted on the ceiling, whereas in the second case the

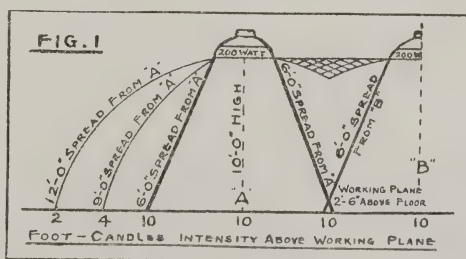
rays of light are collected and so directed with more intensity through a less volume of space to the working area, which, after all, is where the light is needed. A comparative test illustrating the foregoing was, without reflector, 4-foot candles; with reflector, 6.3 foot candles—making an intensity increase of 57 per cent.

From observations made in the Institute plant, the daylight or blue lamp is preferable over that of the clear lamp, the light being much whiter than that of the clear lamp, which has a distinct yellow color.

From the results of the tests and observations recorded an intensity of 8-10-foot candles is the most desirable for all departments of a bakery, including the offices. This was obtained by proper spacing and height of the lighting units to give an even distribution of light in all directions.

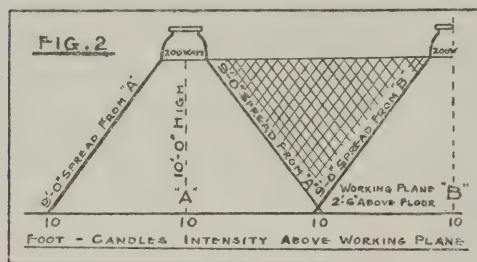
It is impossible to lay down a hard and fast rule with respect to the spacing and height of the units, as different types of reflectors differ in their reflecting intensity and capacity.

To illustrate the difference in directional reflecting intensity of various types of reflectors, two distinct types are shown, Fig. 1 being that of the dome type and Fig 2 that of the inverted bowl type.



In illustration 1, the light intensity of 10-foot candles is spread over an area of 12'-0" diameter equal to 113 square feet on the working plane, and also gives light

of much less intensity to an area of 24' 0" diameter less the area of 12' 0" diameter, being equal to 339 square feet. The space between each unit in this instance is completely lighted, giving the whole room a general lighting effect.



In illustration 2, the light intensity of 10-foot candles is spread over an area of 18' 0" diameter, equal to 254 square feet on the working plane, and the space between the units is more or less dark as shown by the squared area.

Consequently the room as a whole has not a well lighted appearance, but an area of 141 square feet more on the working plane is lighted with the same powered lamp as illustration 1.

In the foregoing we have dealt with reflectors and their maintenance, in respect to artificial lighting. There is, however, another big factor to be considered, both for natural lighting and artificial lighting, and that is, the effect of the color of walls and ceilings on the resultant illumination.

No matter how carefully designed a lighting system may be regarding the type and size of lamps and reflectors, spacing and height, if the surroundings are not adapted to reflecting the light that strikes them, no great improvement will result. The ceiling and wall surfaces in a room are secondary sources of light, receiving and reflecting light and affecting the resultant illumination according to their reflection factors.

It is desirable to have the secondary

sources as light in color as possible—pure white usually being preferred. Not only is the color of importance, but the actual finish must be considered. A glossy surface reflects images of the lamp filament, and glare is introduced, causing eye strain. It is, therefore, essential that a flat or matt surface covering be used.

Color of Paint Important

It is well to note that a number of paint manufacturers specialize in the manufacture of "paint for light."

A conservative figure of between 20 and 30 per cent has been given as the difference between well painted white ceilings and ordinary light buff or similar colored ceilings, where semi-indirect or similar lighting systems are used.

As the range of paint colors commonly used is so broad, the most feasible means of presenting reflection factors is shown by the following table of colors and percentages—the result of a considerable number of tests made by different authorities:

Colors	Percentage of Light Reflected
White—new	82 to 89%
White—old	75 to 85%
Cream	62 to 80%
Buff	49 to 66%
Ivory	73 to 78%
Gray	17 to 63%
Light Green	48 to 75%
Dark Green.....	11 to 25%
Light Blue.....	34 to 61%
Pink	36 to 61%
Dark Red	13 to 30%
Yellow	61 to 75%
Dark Tan.....	30 to 46%
Natural Wood Brown Stain.....	17 to 29%
Light Wood Varnish.....	42 to 49%

It should be borne in mind that good lighting increases production, decreases spoilage and preventable accidents, and aids in reducing labor turnover to a minimum.

Bread and Milk

An unusual experiment with bread and milk is being conducted by Miss Ellen M. Bartlett, supervisor of Home Economics in the San Francisco public schools. Miss Bartlett serves bread and milk lunches to all San Francisco school children. She found that their health and dispositions were quickly affected by improper diet, so she installed the bread-and-milk system. The children were taught to take care of the service themselves and to keep it self-supporting. They bought for themselves \$85,000 worth of bread and milk, the milk factor amounting to 116,000 gallons. Why not encourage the schools in your town to try this self-supporting feature?

Why do hotels and restaurants and dining cars now make it so hard for diners to obtain bread? They charge high for it, never serve it till the diner demands it, and then they serve very small portions.

This post-war service policy may account for a great deal of the lessened consumption of bread. Why not call attention to it in *Baking Technology* and keep on calling attention to it? It would really pay the restaurant and hotel men to serve more bread, for munching on a piece of bread keeps the customer satisfied while he is waiting for his other orders.

—Wallace A. Cook, New York.

It is a good story for the baking industry that appears in the *Rotarian Magazine*, and it makes me glad, as a Rotarian, for the little part I have had in helping to forward the cause of the American Institute of Baking.

—H. E. Howe, editor of *Industrial and Engineering Chemistry*.

Strawberries and Bread

LUSCIOUS strawberries—so tempting that the girl who spreads them on her bread seems as delighted as if her best beau had just called up—appear in 80,000 window display cards sent out by the L. & S. Company of Pittsburgh. Not only do the luscious looking fruit and the pretty girl who is using the fruit appear but also the loaf of bread from which she has taken a slice to spread over thickly with the preserves.

Not so long ago such cooperative advertising was unthought of. A suggestion from our Institute found ready acceptance and now "bread the carrier," pulls its load with Indiana preserves as it does with California nuts and raisins, Oregon figs, Illinois butter, Washington honey, Wisconsin cheese, Virginia ham, New York, California, and middle western milk, and Chicago meats.

On an Institute Book

"The Romance of the Holes in Bread" is an unusually interesting book. I wish we had more of the kind to awaken the average man to the romance of science. It comforts me to see that chemists are awakening to the necessity of dropping dry, priggish, pedantic presentation of scientific subjects, which ought to be made accessible to everybody and serve as an inspiration to our Nation.

—L. H. Baekeland, President,
American Chemical Society.

My boys from the very start of eating cereals have had the whole wheat and other whole cereal products. I suppose there are idiosyncratic infants who, like grown people, are highly sensitized and may not be able to eat whole ground cereals, but the number is extremely few.

—Harvey W. Wiley.

Books for the Baking Laboratory

THE CHILD; HIS NATURE AND HIS NEEDS. Prepared under the Editorial Supervision of M. V. O'Shea, Professor of Education, The University of Wisconsin. 500 pages with illustrations. Published by The Children's Foundation.

"In a recent report of an orphan asylum, five pages were devoted to the subject of mental tests, while two lines summed up the results of the health inspection. Yet in this institution more than a third of the children were suffering from malnutrition."

"A third or more of all the children of this country are under weight, undernourished, malnourished; physically, and, therefore mentally unfit."

"Nutrition work in Rochester, N. Y., showed that 1,000 of the most undernourished children of the city could be made to gain at the rate of 343% by detremining the causes of malnutrition and removing them to special nutrition classes."

These pertinent paragraphs quoted from *The Child, His Nature and His Needs*, the excellently printed collection of monographs on our knowledge of the child, published by the Children's Foundation, show in most vivid fashion the need for better nourished child life. The success of modern agriculture is based on the proper feeding of dairy and beef cattle, hogs and poultry. Every farmer knows how to care for his stock to produce maximum growth and production. But the child stock of the human family is not so intelligently fed and reared. From a nutritional standpoint it is far better to be born a calf than a child.

The Children's Foundation established by Lewis E. Meyers, proposes to study the child and spread the facts which promote the well-being of children. In effect it will do for children what Agricultural Experiment Stations have so well done for animals.

The first volume devotes more than 500 fascinating pages to the discussion of the present status of our knowledge of child nature, his well-being and education. The many chapters have been written by eminent students in the field of child life and cover, as well as any single book can, the wide range of child interests. Of special value are the chapters on the relation of nutrition and mental development, the adolescent period, and promoting the health and physical development of school children.

The trustees of the Foundation have established a fund through which this most valuable contribution to the literature of the child may be obtained, express prepaid, upon the subscription of one dollar to the Publication Fund. The address is: The Children's Foundation, Valparaiso, Indiana.

Abstracts of Technical Articles

Selected for Baking Technology from Chemical Abstracts

Induction of growth-promoting and calcifying properties in a ration by exposure to light. H. Steenbock. *Science* 60, 224-5 (1924).—Proceeding on the assumption that failure of growth on basal synthetic rations without the effect of illumination was due to a condition fundamentally the same as rickets, experiments were initiated in which such rations were illuminated and then fed to rats. The result was that illumination of the ration caused it to become growth promoting and, in addition, it was found that the ash content of the bones of rats receiving such a ration was increased in percentage over that of rats receiving the non-radiated ration. It was also found that irradiation of fats, otherwise inactive in preventing rickets, caused them to become active, and that rations which ordinarily produced wide rachitic metaphysis in the shaft bone of rats became antirachitic and promptly effected a rapid and complete healing of the lesion. These facts have now been correlated with what is known of the properties of antirachitic vitamin and found in substantial agreement. To protect the interest of the public in the possible commercial use of these findings, applications for letters patent, both as to processes and products, have been filed with the U. S. Patent Office and will be handled through the University of Wisconsin.

L. W. Riggs.

The satiety value of toasted bread. Hans Sehestedt. *Z. physiol. Chem.* 139, 212-5 (1924).—By means of gastric fistulas, which exclude psychic stimuli, the satiety values, i. e., the suppression of hunger sensation, were determined for dogs after administration of aqueous extracts of toasted and untoasted bread, the

same volume of H_2O being used for controls. The acidity of the extract, after remaining in the stomach 15 minutes, represents the stimulation of gastric secretion. This was found to be much greater with toasted than with untoasted bread, the latter giving the same values as H_2O alone. The acidity produced by toasted bread was equivalent to that produced by meat extract. Baking powder bread gave as high values as yeast bread. Maltose and dextrin had very little influence on acidity. Similar differences were noted between raw and roasted or boiled potatoes.

A. W. Dox.

Use of brewery yeast in bread making. D. Van Haelen. *Inst. sup. ferm. Gand* 24, 326-40 (1923); *Chimie et industrie* 12, 343 (1924).—As a result of comparative analyses and dough-raising tests of distillery yeast and of top and bottom fermentation brewery yeasts, H. concludes that brewery yeasts are as suitable as distillery yeasts; but top fermentation yeast requires the addition of 0.02 g.-mol. of KH_2PO_4 and bottom fermentation yeast requires the further addition of vitamins, in which case it has a higher fermenting power than distillery yeast.

A. Papineau-Couture.

Counting yeast cells in dough. H. E. Turley. *Cereal Chemistry* 1, 261-7 (1924).—A method is described for counting yeast cells in dough in which pepsin is used to break down the proteins, thus eliminating large particles of gluten that obscure the field and make counting difficult. Comparative results are given for this method and the Neumann method. Pepsin seems to give more consistent results than the method in which yeast is removed from gluten by washing with water.

Ruth Buchanan.

Metabolism in obesity. W. Arnoldi. Z. Klin. Med. 94, 268-316 (1922).—A respiratory quotient greater than 1 was observed in obesity (formation of fat from carbohydrate). A diminution in carbohydrate combustion and hyperglucemia was also found.

F. A. C.

The role of fats in nutrition. H. W. Wiley. *Am. Food J.* 19, 308-9 (1924).—An address.

J. A. Kennedy.

The digestibility and efficiency of the protein of toast in adult human nutrition. Martha M. Kramer and Edna St. John. *J. Home Econ.*

16, 307-9 (1924).—Metabolism experiments upon two women subjects indicated that the protein of toast is as well utilized by the adult as that of untoasted bread.

L. D. Elliott.

Old and new ideas of diet. P. B. Hawk. *Am. Food J.* 19, 379-81 (1924).—A short discussion of the changes in dietetic standards and the comparative study of vitamin A and vitamin D role of vitamins followed by a report on a content of margarine ("Nucoa") and butter. Conclusion: "Nocoa" has not only the proper content of vitamin A but also that of D. It seems therefore, that there is no sound, scientific, practical or economic basis for excluding this vegetable margarine from the diet."

J. A. Kennedy.

Patents

Whole-grain bread. P. Gross. U. S. 1, 506, 830-1, Sept. 2.—A dough suitable for the production of a whole-grain bread or other food products is prepared by subjecting whole wheat or other grain to a washing and agitating operation to remove the husks, thus forming a dough mass including mashed grain and husk, and then forcing air upwardly through the mass to bring the husks to the top of the mass hence they are removed by flowing off with H_2O . An app. is described.

Treating wheat for food. J. H. Dunn. U. S. 1, 506, 574, Aug. 26.—Matured wheat is successively cleaned, steamed, dried and polished and is then placed in a receptacle with H_2O 2.125, sugar 0.04, and salt 0.014 part for each part of grain. These materials are allowed to stand together in a permanently sealed vessel for about 10 hrs. and the vessel and contents, while held stationary, are subjected to a sterilizing temp. for about 2 hrs. at about atmospheric pressure and then to steam pressure of 5-8 lbs. per sq. in. for about 1 hr. Oats, rice, corn and legumes may be similarly prepared.

Treating flour with calcium phosphate and oxidizing compounds. L. H. Blouch and J. H. Roop. U. S. 1, 497, 477, June 10.—To facilitate the production of bread of satisfactory quality from flours containing a much greater proportion of the entire wheat than is present in so-called "patent" flours, the flour is mixed with $CaH_2(PO_4)_2$ 2 oz. and $K_2S_2O_8$ 0.0143 oz. per 100 lbs. of flour. $KBrO_3$ and $NaBrO_3$ also are specified as oxidizing salts which may be used.

Concerning a Student

WHO would think of the romance tucked away in the life of one man, now a student in the American Institute of Baking? Once he was busy installing a dough mixer on a U. S. Man of War. It was the first dough mixer ever installed on a battleship of the American Navy. Again he was busy fighting through the brunt of the Filipino rebellion in the Philippines, and as soon as the fighting died down he became a baker that the Americans might have their daily ration of bread.

Under Funston he fought in those harsh days. Later when the fire and earthquake devastated San Francisco he emerged into the presence of Funston. He saluted his old commander who had eaten his bread in Manila.

Funston understood that salute in a day of martial law and general disorder. "Go down to the plant of the California Baking Company," Funston ordered, "and start up that plant and keep it—baking bread. The power was gone. The water pipes had bursted. There was no light, even, to be had. But this present student of our Institute went. He remembered the old days of hand-baking in the Philippines. He started up a shift of hand-bakers. For 24 hours a day three of these shifts worked and he bossed the night shift so that refugees had their bread, until light, power, and the regular supply of water would be reestablished.

George Roberts of the El Paso bakery knows him for he went to El Paso and took charge of production in the Purity plant just that he might have the fun of coaching the football team on the side. Incidentally the football team was not scored on while he was its coach.

Many bakers know this student of ours. He was president last year of the Los

Angeles Association of Bakery Engineers.

The Southern Pacific railroad officials know him for he had charge of the commissary on their Mexican lines after leaving the Purity plant at El Paso. When the Langendorf plant was opened in San Francisco he was one of its bakery force and in 1918 he went to Los Angeles to take charge of the Franco-American plant. A shift in the Love plant at Honolulu, and another in Los Angeles—and then the American Institute!

There is a foolish theory held by some that college men, especially graduates in chemistry, might find the work of the American Institute too much of a kindergarten for them. Others feel that youngsters only should be selected to take the course.

Here we have W. E. Doty, a seasoned veteran of baking under every conceivable condition. And what is it he has to say? "I am only sorry I did not come to the very first class. Any practical baker can say what he wants to but nobody can claim to know the baking business until he has taken this course. I am daily finding how little I know and what enormous errors I committed in the old guess-so days. I would recommend this course to every man in the baking business who has not taken it. He can't go wrong by taking it. It keeps one abreast of the times. I do not know of any adventure I have ever enjoyed more."

When he graduates Mr. Doty will move into that interesting new field—the field of flour mill service men who will travel for great flour mills to see that no baker makes bad bread from their flour through missing points that can be taught him. Already this field has absorbed more than a score of Institute graduates and all find plenty to do.

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Our Niagara of New Ideas

TWO new groups which have taken a permanent place within the baking industry met in Chicago, one in February, and one in March. Both sang parting songs at the end of their conferences and the burden of these songs was "On to Buffalo." The spirit behind this idea is much more than that of creating a mere slogan. It means "On to conference with bakers from all over the world—on to co-operation and consultation and the mutual working out of problems." One of the groups whose members decided they ought to be at Buffalo in force was the group having to do with sales promotion

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— with the telling of the baker's story so that baker's bread will be esteemed in every home it enters, and will be consumed in full confidence that the purchaser is receiving from the baking industry the best service it is possible for Science and good will to yield. The other group was composed of those who make the bread that the sales managers offer to the public. In their meeting—preceding the final wish that they

might reassemble at Buffalo for their next conference—these men cast out of their thoughts all matters of bread stories and bread salesmanship. Instead they centered on just one item—bread production.

They were the bakery engineers on whose work good or bad bread will pass from ovens and cooling racks into the hands of the sales managers to be forwarded to centers of consumption. These men want to meet in Buffalo to talk bread production under the leadership of men like C. J. Patterson, expert on fermentation problems and on executive control of groups of workers, just as those who meet under the guidance of Elmer Cline will want to talk bread salesmanship.

The fine thing about these conferences is that both will be "for the good of the industry" and will be open to all so that every plan brought forward and analyzed can be carried away by anyone who will take the trouble to show the necessary intellectual curiosity.

What then is this gathering at Buffalo from September 14 to 19? Time was when three or four convention sessions of American Bakers Association would furnish the answer to all questions about a National convention. But that time has passed. This Buffalo week is going to be a week of conferences—"meetings of brothers in a cause who convene or come together to talk things over" and mature national policies, each group for its own cause.

The conferences already called indicate that conference sessions will be the center of the convention week's real work. There will be a conference of the house-to-house bakers, of the cake bakers, of the pie bakers, of the sales managers, of the specialty bakers, of several foreign bakery groups. In the large hall of the armory at Buffalo the main convention sessions of American Bakers Association will be held, and these will confine themselves to National issues that all must unite in solving. On issues that each group must solve for itself the conference groups will go to work, each in its own way.

That means advance—a stepping forward into a new phase of the work of marshaling the baking industry. It means also that the Buffalo Exposition Week should see the largest assembling of members of the baking industry that the world has ever known.

And for the first time the visitors may come from all the world. For the exposition of bakery machinery to be made by the Bakery Equipment Association is the first world-wide exhibit ever attempted. In the three years since the last exposition, held on the Municipal Pier, Chicago, many new machines have been invented and many new improvements have been designed for machines already in use. All these will be shown. When Col. Scholl, commanding the Sixty-fifth Regimental Armory, signed on behalf of the state of New York, the contract turning the armory over to the Equipment Manufacturers for the week of September 14, he surrendered to President George E. Dean a total of 75,000 square feet of floor space.

Space in Demand

Of this 75,000 square feet of space more than 60 per cent had been requisitioned by members of the B. E. M. A. before the contract for the armory was signed. That means that almost every prominent manufacturer of machines will have some new improvements to place on display or will bring out some new machines entirely.

For instance, one manufacturer found that the effort to run the larger Pullman loaves through an "extension device" on the moulder used for ordinary pan bread, resulted in tearing the dough. He did not like the results obtained and decided that for plants making enough Pullman loaves a special moulder for Pullman bread was necessary. He worked up such a moulder and will have it on display.

Some Odd Stories of Machines

Much romance will lurk behind many of the "cold steel" machines that will attract visitors from all over the world. For instance, a bakery machine company's employee once bought a pound of sugar. The grocer handed it over in a paper sack, after pouring it from a drawer. He had not weighed it. The man interested in baking machines asked about it and was told by the grocer that he had built this sugar drawer just to hold a pound—it saved loss of time in weighing. He went home—thought a while—and out of his thinking sprang full born an idea. It was the idea of building compartments in a machine that would divide dough by measure—so that adjusted measures full would work out in pound and pound-and-a-half weight units. Thus grew up the world's first dough divider.

Mixing Machine Types

Just so with the mixers. One supplies salesman saw a paint mixing machine and thought he could adapt it to bread mixing. He did—and found that the one arm would not work, as the dough had to be stretched as well as mixed. So he added a second arm to a one-armed paint mixer and got America's first bread mixer.

In another part of the world another baker saw a putty mixing machine and bought one as a basis for working up a bread mixer. He accomplished his end and the paint mixer and putty mixer both are therefore parents of different types of dough mixers.

Engineers on Machines

At the show these machines will vary all the way from small cake mixers to huge machines holding several barrels of flour and working at speeds higher than most believers in high speed mixers, even, have so far considered possible.

That there is a very close alliance between the development of better machines

and the development of better bread, Richard Wahl reminded the Society of Bakery Engineers at each of its Chicago sessions. He pointed out that the great problem of the modern production manager was the management of machines—and of a working formula for the machine crews. The old foreman who was primarily a bench hand, Mr. Wahl pointed out, was as extinct as side whiskers, fabric tires, two-wheel brakes, and boiled shirts. He indicated that the proper study of the bakery engineer is bakery machines and that as one kept his machines in order so did the flow of production remain in order.

Therefore the machinery exhibit will be a matter of intense interest to the engineers of our industry, just as their production problems will be of intense interest to the sales promotion men, who must handle the goods they turn out.

Floor Scales

Has your bakery a set of floor scales with a dial working over the face as hands do over a clock's face? If not, your bakery stands condemned by the Society of Bakery Engineers as behind the times in bakery practice. If you would know why a society devoting its interests to production problems is essential you should study the minutes of the Bakery Engineers' meetings on this floor scale topic alone.

One baker reported that he wanted to check up on a loss of flour occurring somewhere in his plant. It was checked out of the supplies room but did not show up in the oven count. As long as he had no dough room floor scales he was at a loss to check his losses. He installed a scale and began weighing the dough as it left the mixer and as it left the moulder. The loss was immediately located. Flour leaving the supplies room was not passing through the blender. A certain workman was appointed to watch the blending and mixing operations. The losses ceased at

once and never reappeared. The baker guessed how the flour had been getting away and the employee he suspected, on finding the floor scales were watching him, ceased all operations.

Another baker reported a saving of \$600 per month on invisible losses he had been able to detect through use of a floor scale. He issued dusting flour separately and by checking on it against a normal use for several bakeries, was able to save more than half his bill for dusting flour every month.

Study of Morale

Morale among workers was studied as closely as even the matter of a dough room floor scale as the key to finding bakery losses. Mr. West of Indianapolis, one of the younger and most rapidly growing of bakers, reported that he found there was no morale in the world equal to that of having your men have confidence in you and liking you. So he built to win morale. For that purpose he saw that machines were lined up right—to challenge the men's admiration rather than their contempt for an unkept shop. He told of recognizing ability and service with constant thanks and rewards. Richard Wahl, presiding, took a piece of chalk, and as each baker present called off some point making for high or low morale, he wrote the points down on a blackboard.

In a few minutes he had 28 points on which morale can be built or broken. These included the obtaining of group insurance, the forming of executive councils, organization of competitive meets between crews, organization of athletic clubs, and the keeping of new machinery coming into the plant as needed.

It was just so with scores of other issues taken up. Even the matter of the effect of sulphurous water, of iron-impregnations in the water, of lime and phosphorous salts in the water, was threshed out

at length. The record of all that transpired was taken down for reproduction and a "Book of Proceedings" will be issued within a few months.

A study of this book should equip every baker visiting the convention at Buffalo to appreciate the meaning of each machine on exhibit. So many letters from England, Germany, Spain, Japan, and other countries offer co-operation and support that there can be no doubt of the exposition's huge success, no matter what angle of interest lures a visitor thither.

Richard Wahl

WHO was it brought the Society of Engineers into being? How did the Society come to grow within a year from an initial group of 97 members to over 318 members? Richard Wahl, its first leader, will tell you it was a case of destiny. From the chair he personally thanked the Continental Baking Company for leading the path of Bakerydom down into Wall Street and waking Big Finance up to this fine industry. He thanked the Continental for doing something more than this. It was to wake the Industry up and to arouse its spirit and its zeal to know itself and study its problems. Richard Wahl voiced no fears that medium-sized bakers would be engulfed and forced to the wall. All he feared was Ignorance. He declared all secrets were open—to those that had the intelligence to learn.

Four days of intimate discussion of every bake-shop problem, followed at last by Richard Wahl's question, "Are there any other items concerning bakery production that anybody wishes to bring up?—if not we will adjourn," proved the truth of this assertion. The foe of the baking industry is—Ignorance and the blind fears that breed, along with stubborn pride in self-knowledge, in the minds of the Self Sufficient who stay at home.

Richard Wahl had his own theory of what led the Engineers on to their great accomplishment. The present writer feels that in spite of all these forces there was another. Mr. Wahl had a way about him of getting hold of his audience and inspiring its members to spontaneity and participation. Presiding officers there have been who parade their own power and extinguish that of all others—and suppress self-expression in any audience under their care. Mr. Wahl made every engineer feel that this was his meeting—his conference. And accordingly he felt free to participate a year ago, and he spread that spirit through the year until there was a regular contagion to attend in 1925.

Science and the Home

THE American Chemical Society has just published the results of its first prize essay contest for students in the high and secondary schools of the United States. The funds for this contest were provided by Mr. and Mrs. Francis P. Garvan of New York.

In a letter conveying his gift to the society Mr. Garvan stated that the purpose of the contest was to arouse in the youth of our country an intelligent appreciation of the vital relationship of the development of chemistry to our national defense, to the development of industry and our natural resources, to agriculture and forestry, to health and disease, to the home, and to the enrichment of life.

It is estimated that 500,000 students were interested in the contest. From the many thousand essays submitted six first prizes were awarded.

One of the most interesting prize essays discussed, "The Relation of Chemistry to the Home." The following paragraphs from this essay are of special interest to the baker.

"Along with the preservation of food products comes the development of bread

making to the point where it is generally conceded that bakers' bread made in the proper manner is more sanitary and convenient than the old home-made bread. The relation of the chemist to this development may not be so apparent, but nevertheless it does exist. He has taught these bakers who produce our bread on such an enormous scale the proper uniform method for making their product. (He also acts as supervisor and inspector, and sees to it that the bread we eat is wholesome and free from any adulteration whatsoever.)

"Yet, more important than all these contributions of chemistry to the food problem of the home, comes the formulation of the theories of nutrition, which have now become common knowledge and which enable us to prepare a better balanced diet from which the maximum nutritive value may be obtained. The struggle to discover all the factors necessary for the proper functioning of the human body has been a long and difficult one, and it is only at a recent date that we have learned the true relation of the various foods to our body. The requirements of human nutrition have been formulated in explicit, scientific and practical terms. We know now how to use our food supplies to the best advantage in order that all people may be as well nourished as possible. And good nutrition is a very large factor in the health and happiness of our home life."

I have been asked by the Oregon State Laundrymen's Association to make an address at their State Convention at Pendleton, in May. They want me to tell the story of the American Bakers' Institute and what it and our association have done for our industry. I wonder if you would be kind enough to send me the story of our National home brought down to date?

—H. H. Haynes, The Dixie Bakery,
Portland, Oregon.

BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

I. K. RUSSELL, Editor

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We Work Together

To win through knowing our markets and developing their full potential possibilities, a higher place for the baking industry in the great family of America's business life.

Quo Vadis

MY contact with the baking industry is measured in the last fifteen years. Fifteen years ago, if bakers will think back that far, they will realize that the bakers who were failing were those who resisted the machine era. They were the men who loved the feel of the dough, and looked upon the steel arms of the mixing machine as weapons that had come to rob them of the joy of their work.

Let's move up five years. Ten years ago we find the bakers who were failing were not so often what are known as "the hand shops" as the "dirty shops." Machines had not entirely answered the need, and for the next few years bakers had to be sold to the communities in which these existed, and when a baker forged far ahead to standards of sanitation which no housewife could excel, then this one baker led that community in sales.

The last few years have shown us that sanitary bakeries and machine-equipped

bakeries are not enough, because people expect their bread to come from a clean plant the same as they expect their automobiles to be well engineered and stand under the driving strain. And we find at this day and age the winning bakeries are those in which the science of production, housed in sanitary surroundings, puts out a quality product of unfailing appeal; but more than this, looming ahead of us is still a bigger task for the future. Bread must not only be made clean under the direction of competent production managers, but the laurels of the industry in the next few years are going to the masters of merchandising methods. The housewife, we agree, must have quality bread, and she must also be sold on the inside story of that bread, and must be taught to have and to hold complete confidence in it.

I think it was at this point that the Trade Promotion Conference at the American Institute of Baking took hold in February. Speaker after speaker told bakers in attendance at this conference that personal contact with the consumer was necessary—that advertising was necessary—that merchandising by the bakery salesman was necessary.

The meetings of the Bakery Engineers last year and this year wrote a bakers' bible of production problems. Now we are adding another important chapter to this bible by the managers of sales policies.

One baker from Canton, Ohio, who was present at this meeting went back to his own town, wrote out the first full page newspaper advertisement that he had ever made and inserted it in the local press. This full page ad was a reproduction from an article in BAKING TECHNOLOGY by Professor Shaw on the comparative nutritive value of milk bread over a water mixed bread. He backed up his advertisement by enriching the milk contents of his

loaf of bread. Here was new light, leading a baker from production into merchandising.

Every baker owes himself the privilege of becoming better acquainted with salesmanship problems, the problems that when successfully solved are going to bring to the front the next group of successful bakers from out of the general mass. In your own town your opportunity lies in applying the newer vision the recent conferences have brought to us all from results obtained so far by the Bakery Engineers and the Productions Managers. Our National Association is a priceless boon to our industry. It must not be allowed to retrograde or suffer from neglect.

LEWIS F. BOLSER,
President.

Our Engineers

WHETHER saw anything like it in the whole life story of bread baking? Three hundred men, all tied together through a common bond of interest in making the world's best loaf, practically locked themselves in a room Monday morning, ate their meals there noon and night, and proceeded to engage in one unending, consecutive, discussion of bread quality and bread manufacture!

What effect has water on bread quality—the water of the sulphurous springs districts? Of lime-stone districts? Of districts where the water is impregnated with iron, or phosphorous salts?

These men found elements of interest in the problem that kept them talking and taking notes for half a day. Whether the problem was the matter of caring for dividers, or weighing dough at the mixer instead of in the form of finished bread, the interest was unflagging.

At the end of four days, when one would have expected these bakery en-

gineers to be on one another's nerves and bored to exhaustion, they arose for a seventh-inning stretch. And with a lusty good will they sang "Hail, hail the gang's all here!" Then they shook hands and departed in a new spirit of fellowship that identifies the Society of Bakery Engineers as one of the solid, constructive forces that has too firm a foothold ever to be disintegrated so long as our industry shall endure.

And Now for Buffalo

WHEN things reached a stage where Mr. Ed. Clissold was called on to lead a little singing, this veteran leader proposed a new song:

On, on to Buffalo
Equipment Makers Big Show,
That is where we'll all go.
Meet me at Buffalo
Be sure to go to Buffalo—Bing!

They sang it with a will, for these men at least know that the future of their own shops lies in gaining new ideas from the common council table. They will not only go to Buffalo in September but they will take with them a consciousness that the 1925 brand of efficiency comes from conference and friendship, within the industry—not from fears, hatreds, shivering, and self-immolation in one's own plant.

There will be big conventions at Buffalo—but also group meetings; and in these meetings of the house-to-house bakers, the pie bakers, the production managers, the trade promotion managers, the real work of this World Assemblage of bakers will be done. This is the greatest year the baking industry ever has known and the men who made it so are those who now are planning for Buffalo as good Mohammedans look toward Mecca for delight.

For a Greater Use of Bread

How Bakery, Milling, and Supplies Advertisers Could Combine on a Central Theme to Win Public Good Will

By ALEX F. OSBORN

Of Barton, Durstine & Osborn, Buffalo, N. Y.

The business of leaders of the American Institute of Baking is to study, among other things, those vagrant ideas that are voiced at conventions, and give them a home where they can be nourished and put to use for the whole industry. The Toast Campaign was such an idea, picked up from a speech by John Burns at an Indiana bakers' convention. The "advertise it as it is eaten" idea was spread by this Institute from an original inception in a convention talk, until twenty-seven food industries were cooperating in advertisements that stressed bread as the central food of their otherwise rival groups. Here is another idea—the idea of centering on a central theme about bread and having all national advertisers "play in that orchestra," so to speak. Each would maintain its own control over its own policies and money, but there would be an intellectual cohesion due to conversion to faith in a sound idea. Mr. A. F. Osborn heard the idea in a speech by Dr. Barnard at our last Atlantic City Convention. He worked it up—and here it is as he pictured it forth in the light of his extensive advertising knowledge at a session of the Trade Promotion Conference, held at the American Institute in February.

IT is unfortunate that some business men, in selecting men to manage their advertising, consider that there is some kind of necromancy in it. There isn't. Instead of being based on magic, good advertising for any industry is based on rules as sound as the chemical analysis of the ingredients the baker uses.

As to the mediums to be used they will determine themselves on a basis on which you can keep books just as you can on other bakery costs. For instance there is the basis of the market appeal that can be determined by studying the tastes of your customers and the best means of reaching them with an appeal based on your goods. If you have a story to tell one kind of medium is necessary. If you merely wish to constantly remind the public of your name an entirely different medium is called for—reading matter in one case and outdoor billboards in the other.

In New York City a peculiar condition exists in that the people can't very well look out of the windows of subway trains.

Hence they will study car cards. Car cards therefore take on a special degree of importance. The wise advertiser uses them to a much greater degree than he would use them in ordinary surface cars.

In one city I studied, the bakers were all well hidden from the public. There had been no explanation of the story of bread making for the consumers of the city's bread supply. So we tried to sell the plants to the public. With a \$10,000 fund we divided the items:

Store display	\$ 500.00
Newspapers, 10,000 lines @ 20c.....	2,000.00
Twenty-four sheet bulletins.....	1,600.00
Canvassing, 20 weeks at \$30 each for	
8 women	4,800.00
Direct mail	500.00
Incidentals—car cards, programs.....	600.00

Total\$10,000.00

This is the kind of a program a small town calls for. I would now like to bring up a National campaign. It is one that we have developed out of a few hours spent "listening in" at Atlantic City. There Dr. Barnard spoke on the fact that

the young child needs food enough to maintain itself and also to grow on. The adult merely needs food enough to maintain himself. The four o'clock tea has been fashionable for centuries in Europe. And sandwiches have been the mainstay of that institution—in addition to the tea.

Now we all know we have obstacles to overcome in this country—obstacles in the way of distribution of breadstuffs. The thought we all aim at is the greater consumption of breadstuffs.

Other Foods Active

The media that I have been describing are merely mediums for the promotion and imprinting of your bread name on the public mind. But to try to use these media to carry both the brand and a story to increase bread consumption is to dissipate the effort and to fall through on the job. You can't straddle the advertising question. It is an old formula that you cannot advertise two things at the same time. When a baker spends money on advertising he wants to have it further the interest of his own brand. That is natural and it is economically right.

While these mediums I have discussed are strong for this purpose they are weak when we compare them with the mediums which are being used by our competitors. The women's magazine is one thing which has a ring of gospel to it. It is building its strength on service to the women in home-keeping. Many women have relied on the women's magazine for guidance in the bringing up of their children. Here is an interesting fact, that the woman applies a certain voluntary interest to these magazines, the advertising included. Instead of trying to dodge those advertisements, she looks for them. The women's habits are built very largely by women's magazines.

On that battlefield our competitors are getting the women of America to serve

other foods than baked goods. We have a possible theme that would fit into the women's magazine miraculously well and that theme is the one which Dr. Barnard brought out at the Atlantic City Convention and which has since been exploited. That is the theme of the fourth meal in the American diet, especially in the homes where there are children.

Our job is to increase consumption of baked goods. It is unreasonable to expect that we can make the American family eat more per meal. It is unreasonable to expect that we can get them to eat more bread by shouting "Eat More Bread." It is an empty command that means nothing. It might mean something if it had to do with dates, cocoanuts, or something like that. Bread is more uniform than any other thing in the world, more so than the American government. By simply reiterating the "Eat More Bread" idea, we are simply pounding away at that which has already been established.

The After-School Luncheon

We can put the English afternoon tea into our American diet, but there is one point where the American people are more susceptible than any other people and that is to the hygienic appeal—the rearing of their children. So it is in the fourth meal for children that there is a possibility for increasing the consumption of bread and baked goods. Specifically that is this: To introduce baking industry products into the American habits and into the habit which would be known as "the after school lunch."

Just visualize that opportunity. A lumberjack needs 5,000 calories a day. A boy of 12 needs as much as a lumberjack, but he is being cheated out of 1,500 calories every day. "The baker is your child's best friend."

I presented this idea to an advertising

baker. He was very much interested in it. He liked it on three grounds.

1. He agreed that it had an interest about it that was definite and specific and in terms of the experience of the audience.

2. It had the chance of creating more favorable interest for the baker because it fused itself into the life of the child.

3. It had a more likely chance for increasing consumption because it was a suggestion as to how to eat more baked goods, because it had the possibility of meeting the public appeal and because the youngster would like to have a nice lunch after school.

The paint and varnish industry, which represents one-twentieth of the importance of the baking industry, has been doing an advertising job for the last five years that has nearly doubled its business.

A Billion Dollar Industry

In the baking industry we have a billion dollar industry. An appropriation of 2 per cent would be inconceivable, an appropriation of 1 per cent or one-half per cent would be foolish. **One mill out of every dollar would give the baking industry the biggest campaign of any food producers in the world.** It would be a tremendous task and it would require a great leadership. It would give us something by means of increasing the consumption of baked goods. What the baking industry needs most is a rallying point, an issue which will unify its effort, a rallying point as a unified plan. It would have to be a five-year program at least. To put on a one-year program of this kind would be to throw your money away. The five-year program would have to be based on our object each year for five years. The main idea would be to increase the consumption of bread by pointing out various uses of baked goods. We could actually go out and counteract pop and

candy with nourishing baked goods for that after school lunch. We can combat home baking by substantiating facts based on the same theme of the after school lunch, pointing out to the women how much more important it is to devote ten minutes a day for the children when they come home from school than to devote an hour a day in trying to bake bread. Could people expect to bake bread and baked goods as the baker bakes them? Whether the baking industry could take upon itself such a campaign depends upon whether it can act as a whole.

A Flour Man's View

I asked an advertising flour firm if it could devote some of its money to building up the same point separately. He gave encouragement to the thought and that is the reason I am here today. He thought it should be taken up further. One question he asked as to whether it is scientifically true that the American child in its teens should have more food than he now gets. I came back and brought the question up to Dr. Barnard. There is no longer any doubt on the subject. The thing that you can do is to persuade yourselves. You could take such a central selling theme and weave it into your local advertising.

You might try a three million dollar campaign and thus increase the consumption of baked goods. That is, find out how it can be started. If this thought appeals to you, you might recommend it to the executives of the various associations for further consideration. Committees may make a market analysis that would test the soundness of it from the standpoint of its effectiveness. Such a committee could carry the thought up to their trade, arrange for its being put into a form for presentation that would be definitely considered. It would give us all a central selling theme which we

would be able to use in our copy for our local or own business. It would mean more business because it means greater consumption; therefore, it would mean more profits. It would succeed because it would serve for the race, for the public, it would mean a clearer understanding of the value of baked goods. **If that can be done and done effectively on a five-year program, it would mean a better race.**

Dr. Rumsey's View

Following Mr. Osborn, Dr. L. A. Rumsey, who conducted the Toast Campaign for the American Institute and was associated with the management of the National Wheat Conference, expressed these views on co-operative advertising as a future aim in the breadstuffs industry:

We have the opportunity here at the Institute nearly every day of helping some inquiring baker to get in touch with the type of service he needs to work out his advertising problem.

Every advertisement must give to baked goods as a class, a position of superiority among foods. It must be made to stand out as the foundation of health, the focal point around which all other foods are grouped for happy health. "Something to Eat" must always mean **bread** with butter, or milk, or meat, or cheese, or jam, or some other of the essential healthy foods, and it can be done without detracting in any way from your individual name or brand.

But every bakery advertisement, whether small or large, which co-operates in spirit with the policy laid down by Mr. Osborn, will have behind it a background of millions of dollars worth of cumulative appeal, both by bakers and on the part of those other food industries which co-ordinate their work with ours. And again I repeat, it pays. That's what those ad-

vertising services tell us who are doing the job.

Last year the advertising bakers of this country spent between two and three per cent of total sales in advertising hundreds of brands, using every conceivable sort of medium. So much of it was scattered and without unity of purpose that one hesitates to estimate how many thousands of dollars were wasted. **Out of the five thousand pieces of advertising received at the Institute last year you could count on the fingers of your two hands the campaigns which really were carefully worked out.**

Right now we face a flood of competition in a variety of prepared or patented food combinations that will make a mere table decoration of bread unless counteracted. The present price of successfully competing with this deluge of substitutes would be high, but it could be done. If only one-tenth of one per cent of all bakery sales were devoted to a complete campaign we could outweigh all the combined co-operative national magazine advertising which was done last year.

Mr. Osborn visualized for us a co-operative national baked goods campaign costing a million dollars each year, backed by ten to twenty millions more of co-ordinated local copy, for an industry that sells a billion dollars worth of baked goods a year. That much will probably be spent anyway this coming year in separate campaigns. But it can nevertheless be made effective by following the plan outlined. **We are all telling the same story, and it will carry further if we all say it together.**

A few years ago the manufacturers of coffee substitutes launched an attack on coffee which was severely felt by those people whose business is the raising and importing of coffee in this country. Two years of co-operative advertising by the Joint Coffee Trade Publicity Committee

increased the use of their product by 399,000,000 pounds at a cost of less than one-sixteenth of a cent per pound.

If so humble a product as sauer kraut can be transformed from a boarding house clown into a prince of the hotel menu by two years of concerted advertising, what can't we do with bread. The sauer kraut packers last year experienced the largest pack in their history on a rising market, and will continue their efforts.

Dairy Council's Success

The National Dairy Council in three years of co-operative advertising for the milk dealers has increased the consumption of milk 23 per cent and the whole campaign was purely one of health education.

Those are only three cases out of a total of 33 co-operative campaigns, national in scope, which were carried out last year.

Make the advertising of bread, milk, butter, cheese, meat really cumulative and you have an overwhelming balance of power.

Every publication you pick up demands that you consider some food other than bread. Twenty million girls are stepping ahead into the homes as housewives and food buyers every year. They must not forget bread. As a rule these new buyers are open minded. They are eager to get new and better information about their daily foods. No food facts can be made more welcome or more attractive than those of bread when it is glorified as it deserves to be.

Food for the Underfed

AT Manhattan, Kansas, Pearle E. Ruby broadcasts daily talks on nutrition. She is professor of Food Economics and Nutrition at the Kansas State College of Agriculture, and so has had especial facilities for observing the relationship of

the diet to the physical condition of young men and women.

If anyone hearing her recommendations over the air, should think the fourth meal per day, advocated in articles in *Baking Technology* for the school child, is "loading it on heavy," what would such a person think of six meals per day?

Six Meals a Day

Yet here is Miss Ruby's statement of what six meals a day did for an under-nourished child—and what happened when the child went back on the three-a-day diet.

"First of all you must eat enough," says this experienced broadcaster, in one of her aerial treats. "That is exactly what most young folks do not do. Some under-weight young people have found that a good schedule may be worked out with three good meals a day with milk, perhaps, between meals and before going to bed.

For some of you who are so thin you can't even make a shadow, perhaps a 5 or 6 meal schedule with the food rather evenly distributed might be a good plan. I might illustrate how this seemed to be the best plan for James O'Brien. James is about 14 years old, and according to our tables, should weigh about 100 pounds for his height and age. He weighed, however, only 65 pounds. James may have an abnormal digestive apparatus, though the physical examination did not show it.

Couldn't Eat Enough

At any rate he seemingly could not eat enough food in three meals. We put James on a 6 meal schedule, about 2½ or 3 hours apart, and he was able to take 3,000 calories a day in this way. So long as he held to this schedule, he gained from one to two pounds a week. When he went back home and tried a 3 meal schedule again he failed to gain at all for months.

Origin and Value of Protein

It Has Revolutionized the Farmer's Attitude to His Wheat Fields

By M. E. SCHULZ

The Walnut Creek Milling Company

EVERYONE interested in farming milling, baking, as well as the consuming public are certainly interested in these times in the subject of Protein.

Before the advent of buying and selling wheat on protein basis and the difference of 1c-1½c premium allowed per bushel for every quarter per cent (.25) of protein, (which is present differential) the farmer was more interested in a large yield per acre than in the quality of his wheat. For this reason he was prone to jump at new varieties of wheat which offered larger yields per acre.

Investigators have found that protein content of wheat is influenced chiefly by the climate and soil in which it is grown as well as the variety of wheat sown.

Naturally the general climate of a country has considerable to do with quantity as well as quality of the protein of the wheat but the rainfall, temperature and wind velocity during the last two weeks of the ripening period seems to have a decided influence on the value of the matured wheat.

The soil is next in importance in influencing the protein content of wheat as it is the nitrogen in the soil and the resultant nitrogen in the wheat that determines the protein content. In this connection fertilizers have proven their value as has been shown by numerous experiments carried on at our agricultural experimental stations.

Dr. C. O. Swanson in a very interesting article published in the November, 1924, issue of "Cereal Chemistry" reviewed

very clearly the factors influencing the quantity of protein in wheat.

In this article Dr. Swanson emphasized the importance of early plowing because if weeds are allowed to grow much of the available nitrogen is stored in the weeds instead of the wheat plant.

Dr. Swanson also showed that concentration and amount of soil solution are the two most important factors in influencing protein content, the former being determined by the rate at which nitrogen is made available and the amount of soil solution, while the latter is determined by the moisture supply. As a rule it can be said that the higher the protein in hard wheats the better the quality but there are exceptions to this rule.

To the miller, the protein test is of value in that it acts as a check on his milling, and in this way, a uniform wheat mixture can be obtained which naturally results in a uniform flour if his milling process is kept uniform.

Some millers and bakers are inclined to be a little too technical as shown by differences that have arisen over 1 or 2 tenths of protein one way or the other.

In conclusion, a flour should not be approved or condemned because of a certain protein content alone but should be considered after making complete analysis and final judgment should not be passed until a thorough baking test has been made under proper conditions.

In this connection bakers and millers alike should avail themselves of the many advantages offered by the American Institute of Baking.

Our New Livingston Library

*A Gift from Julian and M. L. Livingston, It Establishes our
Institute as World's Bakery Research Center*

WHEN Julian Livingston, baker of Chicago, first stepped within the door of the American Institute of Baking it is probable that he was not greatly impressed by the work this Institute had set out to do. The Institute was very young then. It was founded by bakers for the baking industry. But they were bakers who were not many in number; they had seen a National vision, and were neither shop minded nor home-town minded.

They had come forth from generations of bakers, each one of whose interests had been confined to the limits of his own delivery routes. National vision was new, then, just as the international vision needed to achieve an enormous world conclave of bakers at Buffalo in September is new now.

In the Highways and Byways out of which Julian Livingston, baker, stepped into the Institute doors all manner of strange rumors were afloat, started by men whose hearts had not yet been touched by a National Imagination of the place their industry could take in the great family of American industries.

One rumor was that the Institute was "George Ward's baby—let him pay its upkeep." Another—issued for the consumption of the "little" baker, was that it was a scheme to lure the little baker in so that the big baker could "steal his stuff"—his precious craft secrets, that were jealously guarded in each shop, yet were the same in all.

Growth Amid Fear

A rumor industriously carried to the present writer was that this magazine, then in its second month of existence, could not possibly survive four numbers.

It has actually survived, since then, four volumes.

Now it just happens that this Institute was preached into existence by men who were driven by the World War to see that the baking industry must have a National home—for research, for the gathering of new data about production, about salesmanship, about nutrition.

Jay Burns, baker, and son of a clergyman, was a valiant preacher of this idea born of National thinking. So was George Haffner of Fort Wayne. So was Win Campbell, who had seen the need while engaged in war work under Hoover's food administration.

When a group of several hundred bakers decided the time had come to back a good idea with good money, the translation of a National vision into a National home for our industry had been begun.

The First Phases

Dr. Barnard came with the headquarters of the National association. That made it an Executive home. With his administrative staff they filled the first floor.

William Walmsley, Victor Marx and Peter G. Pirrie set up a school on the third floor. That doubled the Institute's functions. On the second floor C. B. Morison set up the laboratories for research work. Research—school administration—we were beginning to get an Institute staff!

All this must be "registered" on the baking industry, and attacks from without must be met with a wider spread of knowledge about baking through the press. A publicity corner, for the Association, and a research publication for the Institute were set up. Along came the Co-

lumbia University and Johns Hopkins groups with real data about nutrition. The place of breadstuffs in the diet had to be tested by the new standards. One of the finest test-feeding laboratories in America was the answer to this need, housed separately from the main Institute building, and presided over by Prof. Roscoe H. Shaw.

The Library Problem

But the research library problem remained. To fully flower, the Institute must become the world's center for research work by students of fermentation, of any baking or breadstuffs factor.

In creating the school, flour men had combined to give the necessary flour and so make this their industry's school; supplies men had formed committees and had given the supplies, and so had taken step with our marshaling industry.

When it came to machinery the machinery men had come forward magnificently.

But the research library problem remained. The Wahl-Henius library was already in the building, built exactly for our needs. Could it be purchased?

It was this service to the baking industry that Julian and M. L. Livingston performed when they created the Livingston Memorial Library in honor of their father, Louis Livingston, pioneer baker of Chicago, who died in 1914, leaving his sons a heritage of faith in the baking industry and a love of life which he had expressed in passionate devotion to an old violin he had brought with him from the other side.

Before he and his brother created the memorial to their father that gives our Institute the chief baking library of the world, Julian Livingston worked long and faithfully to build up the Institute school, and the morale of the entire establishment.

For All Bakers Everywhere

And is it for big bakers alone? The books will open for any baker with the intellectual curiosity to seek them out.

The Service Laboratory, under Mr. Berg, and the Bacteriological Laboratory, under Mr. Turley, are open to every baker with a problem involving the bettering of his bread.

Many of our best students came from one-oven plants. They are back in those plants now making them deliver in a way to justify their enlargement.

Do we need to meet the bakers from all the world at Buffalo in September? In our school we have already done it, for graduates are working in China, in Honolulu, in Mexico City, in Canada, in England, and requests for data about baking machines, about our library, are on hand from Spain, New Zealand, Australia, Italy, Germany and England.

Thus the work goes on that the Livingston library enriches and enhances in its power to serve.

The Library's Books

By ROSEBELLE E. PRIDDAT, *Librarian*

IT was in the year 1886 that the two friends, Dr. Robert Wahl and Dr. Max Henius, who had graduated together from Marburg University, conceived the idea of making a specialty of brewing chemistry and this year marked the founding of the Scientific Station for Brewing of Chicago. The first home of the Station was in the rear of a drug store on Chicago Avenue and Robey Street and, as one of the earlier chemists put it, their laboratory was "The kitchen sink."

At first it was an uphill climb for these eager, far-seeing young men, and at the end of the year 1887 only 190 samples had been analyzed. However, by 1890 the work had increased to such an extent that it became necessary to seek larger

quarters and two floors were rented in the old building located on the corner of Lake and South Water Streets. It was with great pride that the young directors and their staff took possession of their new home, even though it was months before the walls and floors could be induced to part with the chicken feathers and other reminders that the laboratories and offices were housed in what had only a short time before been a poultry storage house for some merchant dealing in live fowl.

The few books that were brought to the new home required very little space. However it was the dream of these young men to build not only a business for which neither they nor their families would have to blush in the future, but to lay the foundations of a library on fermentation, second to none in the United States. The best books on the subjects of chemistry, fermentation, physical biology, engineering, and nutrition were gradually added to the library so that when the present librarian, Miss Rosebelle E. Priddat, entered the service of the firm, whose name had now been changed to The Wahl-Henius Institute of Fermentology, on February 16th, 1900, over eleven hundred books filled the shelves of the large square room which served as Library. The furnishings of this room were comfortable, but quite primitive in comparison to those of the present library. The room had two windows facing the Chicago River, and all day long the big and little boats passed the windows and the gulls almost, but not quite, settled on the window sills, glancing curiously, perhaps hungrily, at the bookworms inside the room.

There was no electricity, only gas light and gas lamps, and the Library and Directors' office were heated by a large coal stove. The collection outgrew this room, and some of the older volumes were stored

in cubby holes reaching to the top of the ceiling in the hall. Finally even this space was outgrown, and room for some of the books was found in an empty store, which had now been added to the establishment, in the same building.

By this time the reputation of the Institute had become international, visitors and students from the four quarters of the globe found their way to its doors, and it became necessary to once more think of enlarged quarters. This time it was decided to build a permanent home, one in which there would be ample space to house the school and to take care of the various activities of the institute in a manner commensurate with the dignity of its calling.

Our Present Home

The present home of the American Institute of Baking stands today as the realization of that dream. While the building was in process of erection Dr. Henius spent his entire time on the job, and after work hours, Sundays and Saturday afternoons various members of the staff climbed over the unfinished structure, planning their respective rooms, the location of which had been pointed out to them on the blue prints by Dr. Henius. So it was that the office now occupied by Dr. Barnard was furnished on paper by the present Librarian, who at that time held the combined offices of Private Secretary to the Institute and Librarian, before the floor was even in.

Finally on April 17th, 1905, after several weeks of the most intensive packing, the trucks were loaded and the contents deposited in the yard or on the floors of the new home. The Librarian spent a sleepless night because her books were left in a truck out in the yard all night, having arrived too late the night before to be unloaded. A watchman had been engaged, but a little before six-thirty she

was sitting on the wagon tongue waiting for the movers to get her precious books under cover. A little after seven Dr. Henius arrived on the scene, but it was eight o'clock before the work of moving the books into the building was started. What a day of activity that first day was; with what pride and enthusiasm everyone worked; what well-wishes from the friends, business and personal, that dropped in all day long, what flowers and presents Dr. Wahl and Dr. Henius received, and with what renewed vigor they attacked the ever-increasing problems that loomed up on their horizon!

An Institute Volume

Three years after entering the new home they made a contribution to scientific literature by publishing the second edition of the American Handy Book of the Brewing, Malting and Auxiliary Trades, the first edition having appeared in 1901. This revised, enlarged work contains a wealth of information of inestimable value to all students of fermentology, whether this be in the brewing or baking line. The edition is exhausted and those who are inclined to sell it demand from \$25.00 to \$50.00 for the two volumes, which in 1908 sold for \$12.00. Several other works on brewing and refrigerating engineering, as well as innumerable scientific researches on barley and malt, were published by the Institute in the years following.

In October 1911, the Institute celebrated its 25th Anniversary. The Alumni Association, some 1800 strong, had for several years been planning for this great day, and finally decided it could do nothing greater for its Alma Mater than to dedicate a great literary work to it. The Committee entrusted with the work, delegated Mr. John P. Arnold, a life-long friend of the Directors of the Institute and a Director of the Alumni Association, to write on

the origin and history of beer and brewing. This was finished in time to be presented on the great occasion and does full justice to the thought that gave it birth.

Mr. Arnold worked tirelessly on this labor of love, and although the title, "Origin and History of Beer and Brewing," leads one to believe that it would be of value only to the student of the beverage of pre-Volstead times, it contains much of vital interest to the average reader, for it treats on mythology, political economy in ancient times, of the drinking and eating habits of various people of the earth, down to our own United States in the 17th and 18th centuries. Of special interest to bakers is his quotation from Plinius' "Natural History" touching on leavens and sour dough. This wonderful work then, comprising 411 pages, profusely illustrated, together with a library of ancient volumes for which the four corners of the earth had literally been scoured, were added to the library on the occasion of the 25th Anniversary of the Wahl-Henius Institute.

Then came the years of the great war, and up from the horizon rolled the dark cloud of prohibition. At the first faint signs of this Dr. Henius was quick to understand the "hand-writing on the wall," and closed the school for brewers, as he felt that he could not, in all honesty, hold out any promises for the future to prospective students. The closing of the school caused the model brewery, which occupied a separate building in connection with the main building, the classrooms and the splendid students' laboratory on the third floor, to become useless, and these rooms for several years were peopled only by the ghosts of the dreams of long ago, until in 1922 they once more echoed to the sound of youthful voices belonging to another class of students in fermentology, namely the bakers.

Bakers' Purchase

Three years ago the American Bakers Association purchased the home of the Wahl-Henius Institute, and with it obtained permission to use the Library, which now numbers 6000 books, exclusive of the ancient volumes mentioned above, and about 10,000 pamphlets and clippings. The American Institute of Baking brought with them in October, 1921, a library consisting of not many more than 50 bound books and about three legal sized drawers full of clippings and pamphlets. Several members of the staff placed on the shelves for the use of their fellow-members books of reference from their own libraries. The Librarian of the Wahl-Henius Institute was engaged on part time, which almost immediately, became whole time, as the work of getting a library for the Baking Industry together progressed.

Periodicals covering a number of years were immediately bound, as well as an extensive collection that Dr. Barnard had brought with him, consisting of "Experiment Station Record," "Industrial and Engineering Chemistry," "Journal of the American Chemical Society," and "Chemical Abstracts." During the several years which followed a number of gifts came to the library; for instance, Mr. Haffner contributed 20 volumes of Bakers Helper, Mr. Whitecar, the entire issue of the "National Baker," from 1896 to 1911, inclusive, and annually a bound copy of the "Bakers Review" is received from the Wm. R. Gregory Co., New York.

New Accessions

After Baking Technology was issued in January, 1922, books sent for review came to the Library shelves, and a number of books were purchased, so that now the accession book shows the number to be 252.

In the meantime the Librarian, aided by

various members of the staff, added to the information data file many pamphlets and clippings from various sources; she herself wrote for any pamphlets, Government or otherwise, that seemed to be of interest; collected, as far as possible, the laws of the different states pertaining to the baking industry; conscientiously kept on the lookout for new legislation; made clippings from duplicate magazines, and reference cards for articles of value in those that were not duplicates, until now, after a lapse of only three years, the library of the American Institute of Baking is able to extend its services to members and others interested on nearly every subject they need advice or assistance on. The collection now fills seventeen legal sized filing drawers, and within the next few months more will have to be added. In no other way than by the persistent collection and classification of printed matter, whether clippings from newspapers, trade papers or pamphlets, can it be hoped to keep in touch with the industry as it progresses. There are no books on these subjects and the Handy Book of the Baking Industry is yet to be born.

For Buffalo

During the early days of the war the baker realized how utterly helpless he was because he had no organization. Questions were flung at him and decisions made that affected deeply his welfare. Yet he was not able to make his voice be heard because of confusion about his industry, with no way to reach a common center that could speak for it. The slightest call for a meeting meant real attendance and I am believing that the era of real attendance is returning to our industry. It will result in the greatest meeting of bakers at Buffalo September 14 that was ever held in this country.

—From a letter of a prominent Minnesota baker.

Temperature and Quality

Some Studies of the Effects of Holding Baked Products at Freezing and Below

By I. A. BERG and C. B. MORISON

Of the American Institute of Baking

THE effect of keeping bread at freezing temperatures on the quality of the loaf is of considerable interest to bakers because of differences of opinion in the trade regarding this question. Some maintain that where bread is subjected to the temperatures of freezing (32° F.) or slightly lower, the bread deteriorates and becomes stale.

If this opinion is correct, it has most important bearings on the quality of bread which is delivered to the consumer in cold weather, according to delivery or transportation conditions, since it might be possible on long hauls that the bread might freeze after exposure to continual cold for some length of time.

The effect of temperature on the staling of bread has been studied by some investigators, particularly J. R. Katz of Amsterdam, but the problem of staleness is not yet thoroughly clarified and will not be discussed here at this time.

The following experiments reported are merely our observations on exposing wrapped and unwrapped bread to outside freezing atmospheric conditions as compared to exposure under room atmospheric conditions.

The bread used in these experiments was made by students of the American Institute School of Baking in the Institute shop from a representative commercial formula.

Twelve one pound round top loaves were selected and weighed after cooling one hour at 67° F.

The temperature of the inside of the loaves at the end of the one hour period

was 86° F. Six of the loaves were then wrapped with a good commercial grade of self-sealing wrapping paper. The twelve loaves were then divided into two series of six each, three unwrapped and three wrapped. One series was stored outside in the open air in a ventilated wood slat shipping box in which was placed a recording thermometer.

The second series was placed on a shelf in the laboratory equipped with a recording thermometer and a hygrometer.

At the end of 26 hours both series of bread were reweighed, the outside feel of the loaves noted and the internal temperature of each loaf taken. In each series the unwrapped and wrapped loaf was cut and the flavor, taste, and texture compared.

The next step was to determine the keeping qualities of the outside frozen loaves as compared to the inside loaves when stored under similar conditions in the laboratory. The remaining two unwrapped and wrapped loaves of each series were placed side by side on the shelf in the laboratory for a period of 24 hours. After this period the loaves were reweighed, the outside feel noted and the internal temperature taken. From each series an unwrapped and wrapped loaf was cut and examined for flavor, taste and texture.

Tables 1 and 2 show the weight losses of the two series of loaves during the two periods of time and also for the total time. The observations of the outside feel, flavor, taste and texture after each period will be found below:

Table I.—Losses During First 26 Hours

Mark	Outside						Inside					
	Wrapped			Unwrapped			Wrapped			Unwrapped		
	1	2	3	4	5	6	7	8	9	10	11	12
Wt. after 1 hr. cooling												
grams	421	458	443	442	447.5	462.3	424.9	413.6	462.8	425.1	452	446.2
Wt. after 26 hours												
grams	419	456.8	441.7	437.7	442.2	457.3	420.9	409.2	458.5	400.6	423.6	421
Loss—grams	2.0	1.2	1.3	4.3	5.3	5.0	4.0	4.4	4.3	24.5	28.4	25.2
% Loss	.47	.26	.29	.97	1.18	1.06	.94	1.06	.93	5.76	6.28	5.65
Temp. ° F. after 26 hrs.	28	28	28	28	28	28	72	72	72	72	72	72

Max. Outside Temp.—28° F.

Max. Inside Temp.—75° F.

Min. Outside Temp.—4° F.

Min. Inside Temp.—61° F.

Average Outside Temp.—10.9° F.

Average Inside Temp.—68.1° F.

*Average Outside Relative Humidity—59.

Average Inside Relative Humidity—54.

*From records of U. S. Weather Bureau, Chicago, Ill., March 2nd and 3rd, 1925.

Table II.—Losses During Last 24 Hours, Under Like Conditions
And for Total 50 Hours

Mark	Wrapped		Unwrapped		Wrapped		Unwrapped	
	2	3	5	6	8	9	11	12
Weight after 26 hrs., grams.....	456.8	441.7	442.2	457.3	409.2	458.5	423.6	421
Weight after 50 hours, grams.....	450.7	436.2	414.7	430.2	402.8	451.1	406.5	403.8
Loss—grams in 24 hours.....	6.1	5.5	27.5	27.1	6.4	7.4	17.1	17.2
% Loss in 24 hours.....	1.35	1.25	6.22	5.28	1.56	1.61	4.04	4.09
Loss in grams in 50 hours.....	7.3	6.8	32.8	32.1	10.8	11.7	45.5	42.4
% Loss in 50 hours.....	1.60	1.54	7.33	6.94	2.61	2.53	10.07	9.50
Temp. ° F. of loaves after 50 hours..	74	74	74	74	74	74	74	74

Max. Temperature of Laboratory—78° F.

Min. Temperature of Laboratory—64° F.

Av. Temperature of Laboratory—71.5° F.

Av. Relative Humidity—56.

Examination of Bread After 26 Hours

Loaves	Outside feel of Loaves
1, 2 and 3.....	Hard
4, 5 and 6.....	Hard
7, 8 and 9.....	Soft
10, 11 and 12.....	Semi-hard

Wrapped loaves 1 and 7 were cut and compared for flavor, taste and texture. The flavor of No. 1 possessed a cold freshness and less pronounced than No. 7. The taste of both loaves was good; No. 1 cold and very desirable.

The texture of No. 1 was moist and firm and that of No. 7 soft.

Unwrapped loaves 4 and 10 were cut and examined for flavor, taste and texture. The flavor of No. 4 had a cold freshness and less pronounced than 10.

The taste of both loaves was very good, No. 4 cold and very desirable.

The texture of No. 4 was moist and firm and that of No. 10 soft.

Examination of Bread After 50 Hours

All loaves stored in the laboratory for the last 24 hours.

Loaves	Outside feel of Loaves
2 and 3.....	Soft
5 and 6.....	Medium soft
8 and 9.....	Soft
11 and 12.....	Hard

Wrapped loaves 2 and 8 were cut and compared for flavor, taste and texture.

The flavor of No. 2 was better than No. 8.

The taste of No. 2 was better than No. 8.

The texture of No. 2 was very good, that of No. 8 somewhat crumbly.

Unwrapped loaves 5 and 11 were cut and compared for flavor, taste and texture.

The flavor of No. 5 was better than No. 11.

The taste of No. 5 was better than No. 11.

The texture of No. 5 was good, that of No. 11 crumbly.

In conclusion, the results of our observation do not show that exposure to freezing conditions of the outside atmosphere caused any suggestion of deteriorated bread quality. In fact, it was our opinion that the bread exposed to the outside cold atmosphere possessed a better flavor and taste and that the condition of "freshness" was more apparent also in these samples.

Since the experiments reported have not been extended to include the many types of bread on the market, we do not draw any general conclusions from the results reported.

Our observations do, however, indicate that the effect of a freezing atmosphere did not in this case have a deteriorating influence on quality.

Three Little Maids

CAME three little maids from St. Pascal's School to the library of the Institute last week, armed with a letter from one of our members in Louisville, Ky., and the request by the spokeswoman, Miss Myrtle Gerhaz, was: "We would like to know all about wheat." It was explained that in the space of an hour or two it would hardly be possible to satisfy such a voracious appetite for knowledge in the agricultural field, and after thinking the matter over they decided that they would for the time being confine themselves to the subject assigned them, namely, the cultivation and production of wheat.

They were taken through the bakery connected with the Institute and were much impressed with the equipment and the means taken by the commercial baker to place a loaf of uniform quality on the market. They borrowed an armful of pamphlets on wheat cultivation which they promised to share with other members of their class, and also said they would convey the invitation extended them to come in a body, by appointment, and listen to a lecture on wheat, milling and bread, and inspect the nutrition department. These bright-eyed maidens, potential housewives all, went away delighted with their contact with the modern baking world.

Such groups of school children are easy to find in your town, anxious to see a modern bakery. Are you equipped to see them and make the impression that will last for life?

I am thoroughly convinced that there should be a much closer relationship between the baking industry and the co-operative grain marketing movement as both go hand in hand.

—J. W. Coverdale, Secretary
the Grain Marketing Company, Chicago.

Vitamins In the Mixed Diet

*Laboratory Tests Show That They Are Never Lacking
In Normal American Meals*

By E. M. BAILEY*

Of the Connecticut Experiment Station

In an excess of zeal to emphasize the status of whole wheat bread as the world's greatest beneficiary of free advertising, many so-called nutrition experts, who have never done any laboratory work themselves, continue to print an orthodox chatter that the American diet suffers because of the "removal of vitamins and mineral salts with the bran" from white bread.

Every baker who has ever tried to sell whole wheat bread knows that the appetite rebels against it, the palate gags on a continuous diet of it, in 90 or 95 per cent of the cases. Any observer who goes to a cafeteria, such as that at the University of Chicago—where people can pick up whatever kind of bread they choose, will find that about 90 slices of white bread are chosen to every 10 slices of whole wheat bread. Now comes Dr. E. M. Bailey, who does work in a laboratory and talks by his laboratory records, with a flat statement that no normal American meal lacks all the vitamins and the mineral salts all the people need or want. So the vitamin cry against bread is silly and hypothetical at best. Dr. E. V. McCollum has already stated what Dr. Bailey here states, but Dr. Bailey's paper is printed as added evidence from a source authority as to what the sane view of the situation should be.

THE discovery of vitamins and the study of their remarkable influence on vital processes has materially broadened our conception of food and clarified many nutritional problems hitherto unexplained. In the wonderful story which has been developed in this branch of science, no doubt, the chapters yet to be written will be as remarkable and fascinating as those that have gone before.

It is not the purpose of this paper to review the progress of vitamin research nor to speculate upon that which may yet be undertaken. This has already been done both in scientific and popular monographs, often in the language of those who have contributed most substantially to our knowledge of this subject. Our purpose is rather to consider briefly one of the problems which has arisen by reason of the universal interest which vitamin study has aroused, viz., the rational con-

trol of certain articles of trade which have capitalized the vitamin idea.

The profound disturbances in the health and well-being of animals which can be brought about by manipulated diets, intentionally made inadequate, and the speedy correction of serious conditions by the administration of minute quantities of appropriate vitamin bearing materials that remedy that deficiency, affords a striking illustration of the importance of these so-called diet accessories. It is not difficult to understand why such demonstrations have had a popular appeal and how naturally they have led to the association of vitamins with the idea of curative potency.

Enthusiasts in applied nutrition, less charitably known as food faddists, began to advocate vitamin-rich diets and as large a daily intake of vitamins as possible. This propaganda had the entirely unintentional effect of fostering the belief that the average present-day dietary is de-

* In an address before the Association of American Dairy, Food and Drug Officials at Chattanooga, Tenn.

ficient in these important constituents. Ethical commercial interests anticipated a demand for new biological preparations which would supply vitamins in concentrated form; and the ever-alert fakir sensed a business opportunity. With the discovery that yeast is particularly rich in at least one of these important factors, interest in yeast therapy was revived and most of the vitamin foods or remedies which first appeared claimed yeast as the valuable constituent or stressed the presence of water-soluble B.

Shortly food officials were besieged for information and advice as to the merits of these new commercial articles. Such inquiries came with increasing frequency to our Station and as there was little or no information upon which to base adequate replies a series of feeding tests was planned and carried on over a period of seven months with about 20 different commercial preparations, most of them advertised and sold at the time in Connecticut.

Our problem was first to devise a satisfactory plan for the comparative evaluation of the several products to be tested. Since all of them alleged or implied the presence of water-soluble B vitamin, most of them claiming yeast as its source, it seemed logical to make yeast the basis of comparison. Moreover, through the courtesy of our biochemical laboratory we had access to records of the behavior of animals on given doses of dry brewers' yeast over long periods of time and this enabled us to establish the comparative daily portion to be fed. The tests were conducted upon the hypothesis that a commercial preparation, stressing its vitamin B content, which 'did not exhibit the potency of a good grade of dry brewers' yeast, when fed under comparable conditions, could not properly claim superior therapeutic value as a source of water-

soluble B vitamin. Available data showed that daily portions of 100 milligrams of brewers' yeast, used as our control, was sufficient to cause young albino rats to grow to maturity at a normal rate, and accordingly this amount was the maximum daily portion allowed in our trials.

Yeast in Vitamin Control

We may pass over the plan of procedure and the technique employed, which are given in detail in our Station bulletin 240, and come at once to the results obtained. On the basis of the feeding trials the products examined could be classified into three fairly well defined groups, viz., (1) those which equalled or exceeded the potency of the control; (2) those which were markedly inferior and (3) those which failed completely. Of 21 products tested there were 8 in the first group, 5 in the second and the remaining brands were of the third type. One of the products was conspicuously more potent than the control, growth at a normal rate being secured by daily doses of 25 milligrams. Whether this was the limit of its potency was not determined. Some of the products claimed, and partial chemical analyses showed, the presence of familiar medicaments in addition to the vitamin bearing materials such, for example, as phenolphthalin, emodin-bearing drugs and nux vomica. Although several of the products were conspicuously bitter they were not refused by the animals in the quantities offered and thus, fortunately, the products could be fed without manipulation which might have effected their composition and efficiency.

It may be permissible to call attention to a few points to be observed in biological tests of this type although they would hardly be overlooked by the careful experimenter. The initial weight of the animal should not be too great, 30 to 40 gms. is satisfactory. The duration of the

experimental stage of the trial should be sufficiently long to insure as fair and accurate a test as possible. In general this period was of 30 days duration in our experiments unless the time was necessarily shortened by reason of unfavorable symptoms in the animals. In several instances when commercial preparations were fed, marked gains in weight were recorded for 10 days or even longer but decline followed and perhaps failure. Conclusions based only upon the performance of the first part of the experimental period would have been entirely misleading.

It is further necessary to demonstrate the power of the animal to grow after failure of the product fed. Death of the animal leaves the experiment in doubt; the animal may have been defective. Again animals exhibit individual differences in their reactions to the material supplied. No conclusion can be drawn on the basis of a single trial. The commercial articles themselves may vary in composition; at least duplicate samples of the product under test should be tried. Feeding difficulties may arise due to unpalatability of the test materials. The use of diluents or recourse to forced feeding may be necessary although not always satisfactory. Removal of objectionable constituents by chemical means raises a doubt as to the possible effect of such treatment upon the vitamin itself.

No Vitamin Deficiency

While it is not within the scope of this paper to discuss vitamins from the standpoint of practical dietetics, it may not be digressing too far to observe that students of nutrition are generally agreed that there is no danger of vitamin deficiency in the ordinary mixed diet if eaten in normal amount. When the diet becomes restricted in kind or quantity, as by reason of required limitation or of im-

paired appetite or of other causes, the question of vitamin supply may become a very pertinent consideration. Malnutrition will often be most successfully investigated from the angle of vitamin intake. The extent to which concentrated vitamin preparations can be employed to correct nutritional disorders cannot be stated finally at this time. Authoritative medical opinion is still inclined to the view that vitamin needs can be adequately supplied by simple dietary factors present in ordinary food.

As food officials we are more concerned with the status of commercial preparations which emphasize vitamins as their chief valuable constituents or among such constituents. There is no doubt that the ranks of nostrums and quackery have been somewhat recruited by the commercialization of vitamin discovery, but it should be remembered that vitamin concentrates, as articles of trade, came into existence on a wave of vitamin propaganda and we may be assured that with the passing of the faddists hysteria about vitamins, many of these commercial preparations will automatically pass into oblivion. This prediction is already substantiated if we may judge by the decreased volume of vitamin advertising. The public has a more rational understanding of vitamins and their significance than prevailed even two or three years ago and for this reason our problem, in so far as the control of exploited vitamin products is concerned, to a large extent, will solve itself.

Ethics of Vitamin Uses

The conditions which should obtain for those preparations which survive and are offered for purposes of vitamin therapy are aptly summarized in editorial comment which may be cited from the Journal of the American Medical Association as follows:

"Without prejudging the question as to whether commercial vitamin preparations, as contrasted with less manipulated natural food products, are frequently or even occasionally desirable for therapeutic purposes, it should nevertheless be insisted that such preparations as are offered should at least not be fraudulent. It may well be debated whether laxative drugs should be used in so wide-spread a fashion as has come to be the practice in America; but no one will contradict the thesis that the products offered for sale should fully meet the requirements which the labels on them suggest. Furthermore, they should never be marketed under fraudulent or exaggerated claims."

The problem then which confronts the control chemist is no different from that offered by any other article of food product or drug product. The analytical procedure required is rather more tedious and time-consuming inasmuch as, at present, it involves biological methods of examination. Such methods serve, however, not only to evaluate products of the class herein considered but products containing other types of vitamins, as for example, cod liver and other liver oils as illustrated by the work of Holmes and others. In general the methods which have been evolved for the study of vitamins from a purely scientific standpoint are adaptable also for control purposes.

Concerning a Senator

IF Senator Capper gets a law through to make all bakers bake exactly a 16-ounce loaf, he will put over something that most folks will not at first catch the full significance of.

Such a law will require establishment somewhere of a bureau, or various bureaus, with thousands of inspectors who will, of course, have to be well paid. And

this pay will come out of the public treasury.

The New York Commercial, disposed to be merry over the suggestion, says that the bill should be amended so that there could be added a mandate requiring every cow to give milk containing 5 per cent of butter fat, every hen to lay only white colored eggs of large size, every watch to be so built that it cannot lose time, under penalty of fine and imprisonment for the watchmaker, and every pair of shoes to exactly fit the first time a woman tries them on.

A loaf of bread is presumed to be prepared food ready for the table and the price is understood to be adjusted to the situation and the conditions prevailing. Regulating people's habits, their tastes, likes and dislikes, by Federal statute will not be much longer tolerated by a free people.

Following the Commercial's funny story it should be suggested that the size and saltiness of dill pickles would be a good thing to add as an amendment if a Federal law is to reach out after bread. Popular tradition is to the effect that dills are largely—and joyfully—consumed by young girls, and they should be protected if their presumably wiser parents need Federal aid in such matters.

—The Florida Times-Union, Jacksonville, Fla.

I was very glad to read the Alpha Chi Sigma magazine with its story from the American Institute, telling what bakers and scientists are doing to make a liaison effective between these two important groups. Your Institute is doing a wonderful work for the baking industry, and I am, with your permission, going to reproduce part of your recent story in the Rotary Magazine in a number of the Armour Magazine.

—Armour & Co., by Charles W. Meyers,
Director of Trade Relations.

Modern Pie In the Making

By ROSCOE H. SHAW

Department of Nutrition, American Institute of Baking

ONE evening not long ago I stood in the mixing room of a great pie bakery, marveling as I watched the ponderous steel arms cut into the flour and shortening—barrels of it—with the regularity of a pendulum and the effectiveness of a farm tractor.

There is something appetizingly pleasant about a place where pies are made—the fruity odors, the smelly spices, and the aroma of the flaky crust of a pie right from the oven. To me it brought memories of an old New England kitchen.

There was mother in her white apron sitting by the window. At her feet was a basket of juicy red apples—in her lap a pan. How deftly she plied the knife that removed the peel in long thin curls, and then quartered and sliced the unclad apple. Into the yellow mixing bowl with its white stripes she poured the flour, cup by cup, and mixed it with the lard. Now she tossed the dough on the floured board and rolled it into thin sheets. It was a fascinating sight to watch her mound the apples and then surmount them with a generous cup of sugar out of the blue sugar crock, and a dash of brown from the curious little nutmeg grinder. Now the top crust, with its pine-tree design cut in so the air could escape, was put on and “crinkled” to the lower one so the juice wouldn’t run out. The marvelous pie was complete except for the baking! A glance at the clock on the wall with its long pendulum, and weights on either side, one to keep the wheels moving around and the other to give life for the cheery pealing out of the hours, and she placed the pie in the oven of the old wood-heated range to come out a little later as that

perfect joy of boyhood—a finished apple pie!

With this picture before me I turned from the massive machine that was tirelessly mixing pie crust with arms the strength of a thousand mothers’ arms, to where they were making apple pies on a commercial scale. First I saw a double row of women in spotless, becoming white uniforms and caps. They were preparing apples for the pies, but instead of the small basket, knife and pan, machinery did most of the work. Some of the women sat in front of small machines which they fed with apples from a large bin convenient to reach. These machines peeled, cored, and quartered with astonishing speed. A regular stream of apple quarters fell on an endless belt. Other keen-eyed women inspected them as they passed along in front, picking out the defective ones so that when they reached the end of their journey where another machine cut them into thin slices only perfect quarters remained.

With the vision of the old New England kitchen still before me, I passed to the room where the apple slices met the pie crust I had already seen made. Although it has never been my pleasure to visit a great automobile factory I am told that individual parts enter at a certain point on a huge endless belt to come off at another point a finished car. This was the impression I gained as these pies were made before my eyes.

Shall we follow the path of an apple pie in the making? The pie crust dough from the mixer is taken through chutes to a machine that divides it into chunks the proper sizes for the upper and lower

crusts. These chunks are then conveyed to another machine at which they are passed through two sets of polished steel rollers. One set flattens it one way and the other set the other so that it comes out round and the proper size for the pan on which it now drops automatically. The pan is at the starting point on an endless belt and after receiving its bottom crust passes on by an alert inspector to an ingenious contrivance which causes it to revolve and at the same time meet two brushes that apply water around the edges so that when the top crust is put on it will firmly stick. At the next point it receives its charge of sliced apples, then the sugar and spices. Now our pie in the making reaches another point in its journey where the top crust, prepared in the same way as the lower one, drops, with very little help from an attendant, directly on top of the mound of apples.

Without pause it passes to a contrivance that "crinkles" the crusts together and then to another where the excess is trimmed off to be conveyed by another endless belt to bins from which it is taken to be reworked for other pies. Our pie has now almost reached its journey's end.

Riding Abreast

One more step before the oven—it receives a shower bath of egg and milk to give the appetizing brown we so like to see on the top of a pie. It now passes to the oven and takes its place on still another endless belt. The speed of this belt is much reduced and now the pies will ride abreast, perhaps a dozen or more, instead of in tandem as before. Between the time of entering on the one side of the oven and its arrival on the other to be removed a finished pie ready for loading on the delivery wagon, it has been thoroughly baked.

"So let the foolish choose 'em
The vapid sweets of sin,
I will not disabuse 'em
Of the heresy they're in;
But I, when I undress me
Each night, upon my knees
Will ask the Lord to bless me
With apple pie and cheese."

—Eugene Field.

While I watched the apple pie as it wended its way from the dough and apple to the finished creation, other kinds of pies were being made all around me in variety sufficient to meet the tastes of a great city. I noted that other fruit and berry pies were made in much the same way as apple pie except for the filling.

A slightly different method was used in making the "open face" pies like custard, pumpkin, cream, etc. As in the case of apple pies, the crusts were made by machine, but here machinery ceased to function. The empty crusts were placed by hand in an oven the floor of which was an enormous rotating disc. A man clad in white uniform removed from a huge container ladelfuls of the filler with which he skillfully filled the pie crusts. Although the bowl of the ladle may have been 10 feet away, never a drop did he spill and every pie received the right amount.

Thousands in a Row

Among the more impressive things I saw was the marvelous skill with which meringue pies were made and handled. A pressure of the foot caused a machine to deliver the proper amount of snowy meringue on top of the pie. The baker with his long "peel" delivered them to their places in the oven and then after they had been baked, removed them, three or four at a time, on the "peel," where, if they came in contact, however slightly, one or more unsalable pies would have been the result.

Space does not permit a description of

all the interesting things I saw in this great room where thousands of pies were in the process of making—all at the same time. I had watched my favorite pie from the beginning to the finished whole and I had more casually seen other pies in the making. Now I chose a vantage point from which I could see it all in perspective. Numerous white-clad workers were everywhere performing their own individual tasks, great machines were in motion, enormous ovens were throwing out their heat, yet after all, was it not just a great big kitchen? Instead of mother's tired arms mixing the dough, it was done by power-driven steel arms; instead of the slender knife she used, fast moving machinery peeled off the skins and quartered and sliced; instead of the laborious rolling out of the crusts it was accomplished in a "twinkling" by the polished steel rollers and withal everything was as clean, neat and wholesome as any housewife could desire.

The foreman told me that they were not working at capacity on that shift, yet twenty-five thousand pies would be made that night—if one hundred and fifty thousand boys could have lined up each might have had his slice of pie.

Behind the Pie the Pantry

Before leaving I wanted to see the pantry of this great kitchen. Here I found barrels, boxes and cans, in orderly array, containing many of the things that go to make the pie a delightful part of our food. Crates of lemons were there for real lemon juice is used in making these pies, not the artificial kind some people think go into the commercial lemon pie. Adjoining the pantry are rooms where an overcoat is welcome even in the hottest days of summer—they are the cold storage rooms. Here was crate after crate of berries of every conceivable kind: red raspberries, blueberries, and

even the delicate strawberry, appearing as if just taken from the vines. I picked one up and attempted to bite it but I couldn't. It was frozen solid. These berries are gathered in their season and immediately placed in this room where the temperature never rises above the freezing point, to remain, retaining all their flavor and deliciousness, until needed.

Commercial pie baking as practiced today is a modern industry. Some twenty-three years ago there appeared in the New York Times an article by an anonymous writer concerning pies. It ran like this:

"In our own great and fortunate country the seasons are known by their respective dominant pies—for each there is an appropriate pie, with apple pie for the year round. Thus the winter months constitute the mince pie season, this highly spiced, juicy and meaty composition having the power to maintain the normal temperature of the body in zero weather. With the early spring come the light and joyous custard, lemon, and rhubarb pies to quiet the tender yearnings for the undefined. The perfect days of June welcome the lip-painting berry pies, which increase in variety through July and until August offers the luscious peach. Then as nature paints the forests with her magic brush, come in the golden glory of the year, the royal pumpkin pie."

Thanks to the modern pie baker this condition no longer holds, for now not only do we have the apple pie the year around but with present day refrigeration all the other pies as well. The "joyous rhubarb" may appear on our table in midwinter, and any time we like we may enjoy the "royal pumpkin pie."

I am glad to see the way the bonds existing between the American Institute of Baking and the Carlsberg Laboratory are being strengthened, and I was particularly pleased to see the story of Louis Pasteur so written in an article sent out from the Institute that it could serve as a fairy story for children.

—S. P. L. Sorensen, Copenhagen, Denmark.

From Evening Star

**British Eat Meal
Bread on Large
Scale From Fear**

**White Loaf Said to Be
Cancer Cause and Price
Is Higher.**

By the Associated Press.
LONDON, February 10.—The Eng-
lish are becoming a nation of whole
meal bread eaters. Since the pro-
nouncement, a little more than a year
ago, by the eminent surgeon, Sir Wil-
liam Arbuthnot Lane, that white
bread is probably one of the causes
of cancer, the bakers of England have
noticed a great decrease in the sale
of white bread and an increase in the
consumption of whole meal products.
This change in the national appe-
tite has become so widespread that
the Bakers' Association has issued
posters and pamphlets showing

DANGER LURKS IN WHITE LOAF BREAD

*Probably causes cancer
says eminent surgeon*

**The English demand
WHOLE WHEAT**

Says an Associated Press
dispatch in the Washington
Evening Star of Feb. 10,
1925.

**Leading Washington Grocers
Meet Problem With FARWELL HEALTH BREAD
BE ON THE SAFE SIDE AND EAT FARWELL
WHOLE WHEAT HONEY HEALTH BREAD**

Obtainable at leading grocery stores, delicatessens, cafeterias, res-
taurants, hotels and principal stores of Atlantic & Pacific Tea Co., San-
itary Grocery Co. and Piggly-Wiggly Co.

Try this wholesome, health-giving, nourishing product. If your
grocery cannot serve you, phone us or send a postal card to

Phone Lin. 1031 FARWELL BAKING CO. 218 9th St. S. E.

For the Nonsense Sweepstakes

The above newspaper advertisement is reproduced here for the benefit of bakers who may not be planning to come to Buffalo next September because "outside affairs do not affect my trade." Here is some nonsense originating in England readvertised right in our own communities. The statement that English people are eating more dark breads because of a fear of white bread has been completely repudiated by a survey showing over 98 loaves of white bread in use to two of whole wheat in England, Scotland, and Wales, as in America. Yet the good old canard goes on its good old way.

Books for the Baking Laboratory

FOOD ANALYSIS. By A. G. Woodman, 108 figs. 529 pp. McGraw-Hill Book Co., Inc., New York, 1924.

While the literature of all ages has been filled with references to foods, their production, preparation and adulteration, the subject is ever new. Indeed, the work of the food analyst is still in its development stage. No discussion of the subject is ever final, and published methods, in spite of the efforts to standardize them, are always subject to review and improvement.

Professor Woodman, the author of *Food Analysis*, has for many years been closely associated with food and perhaps better than any other author is equipped to discuss the subject from the standpoint of the latest available information. The chemist in the food industries and the analyst in our control laboratories will find in this, his latest work, a concise and helpful discussion of the important features of food analysis.

In preparing the several chapters, the author briefly discusses the general subjects such as colors, preservatives, and their place in foods, before taking up the analytical methods. In this way the book is made of general interest and becomes more than a technical manual. The tables are sufficiently complete for the purposes of the food analyst and include the latest analytical data.

In view of the importance of the vitamins and of the exploitation of certain products as vitamin carriers, the author might well have included a chapter on the vitamins and the methods which have been developed for determining their potency. In the enforcement of pure food laws the time will shortly come when it will be as important to verify statements as to vitamin potency as to protein or fat content.

The last chapter discusses alcoholic foods and is broadened to include the beverages as in the opinion of the author the alcoholic foods rank in analytical importance with saccharine foods and the fats and oils. Inasmuch as alcoholic foods have by the passage of the Eighteenth Amendment been removed from the list of legal and legitimate foods and beverages, this subject, while still of some interest to the chemist, is to the cursory reader of historical value only. It would seem to be unnecessary hereafter to devote much attention to the discussion of products which do not reach a market except illegally

and which have no proper place in the consideration of American citizens. *Food Analysis* is a definite contribution to the armamentarium of the food analyst.

—H. E. B.

Abstracts of Technical Articles

Selected for Baking Technology from Chemical Abstracts

Experiences with the butter and flour soup of Czerny-Kleinschmidt. Cato H. J. van Lohuizen. *Nederland, Maandschr. Geneeskunde* 12, 575-606 (1924).—The good results obtained in underweight, especially prematurely born infants, in convalescence from nutritional disturbances and in habitual vomiting are probably due to the frying of flour and butter. The incidence of rickets was somewhat higher than that with other foods.

Mary Jacobsen.

Determination of moisture in wheat and flour.

II. Harry Snyder and Betty Sullivan. *Ind. Eng. Chem.* 16, 1163-7 (1924); cf. C. A. 18,2564.—The moisture content of wheat flour was determined by desiccation over H_2SO_4 - HPO_3 and over H_2SO_4 with reduced air pressure. None of these methods gave constant results. A higher moisture content was obtained with 500 or 600 cc. H_2SO_4 than with 200 cc. The lack of a definite end-point is largely due to a shifting equilibrium between the flour and dehydrating agent. Both are highly hygroscopic. There is no definite point at which mechanically held water can be distinguished or separated from that chemically combined with the proteins and carbohydrates.

C. G. King.

Report on (the determination of moisture and of ash in) cereal foods. C. E. Mangels. *J. Assoc. Official Agr. Chem.* 8,140-9 (1924).—Collaborative work showed: Drying in high vacuum at 100 degrees gives maximum results as compared with other methods, and the results are as concordant as those obtained by other methods. Drying in vacuo at 70 degrees did not give satisfactory results with different operators. Drying in air at 103-5 degrees gave somewhat lower results than in vacuo at 100 degrees. The water-

jacketed Cu oven is much less efficient than the Freas electric oven and gives lower results even when samples are dried to constant weight at the same temperature. Temperature rather than time is the important factor in drying in electric air ovens. Variations in results by the vacuum method may be due to the degrees of vacuum used, but errors due to mechanical loss through suction are improbable. The Bailey method for determination of ash (igniting 5 g. in a muffle at about 550 degrees) in the hands of 14 collaborators gave maximum variations of 0.03% and 0.036% with products containing 0.73% and 0.60% ash, respectively.

A. P. C.

The chemistry of the strength of wheat flour.

P. Halton. J. Agr. Sci. 14, 587-99 (1924).—The investigations were undertaken to establish the importance of the glutenin, or alcoholic insoluble fraction of the gluten, in the problem of the strength of wheat flour. Gliadin and glutenin were extracted from various samples of flour. The alcoholic-insoluble fractions of the glutes of wheat flours of different strengths varied in their specific rotations, the protein from the flours of greater strength having a greater specific rotation than that from flours of less strength; specific rotation and strength ran parallel to one another. This insoluble fraction is not a single protein, but consists of at least 2. It seems that strength of the flour is associated with a glutenin of high specific rotation and likewise weakness is associated with a glutenin of low specific rotation.

R. B. Deemer.

Tables for converting crude protein and ash content to a uniform moisture base. J. H. Shollenberger and D. A. Coleman. U. S. Dept. Agr. Miscellaneous Circ. 28, 1-30 (1924).—Tables are given which show the crude protein equivalents on the basis of a moisture content of 13.5% in wheat and flour samples containing from 4.0 to 16.9% moisture; the ash equivalents on the same basis in samples containing from 7.5 to 16.4% moisture; and the crude protein computed from the percentage of total N when this ranges between 1.00% and 5.00%.

W. H. Ross.

Effect of diet on the development and extension of caries on the teeth of children. May Mellanby, C. L. Pattison and J. W. Proud. Brit. Med. J. 1924, II, 354-5.—A diet which with

pups gives well calcified teeth gives the least tendency to development or spread of caries in children. The best diet is a normal one, rich in Ca and the calcifying vitamin, and containing comparatively little cereal and no oatmeal.

A. T. C.

Viscosity as a measure of hydration capacity of wheat flour and its relation to baking strength.

P. F. Sharp and R. A. Gortner. Univ. of Minn. Agr. Expt. Sta., Bull. 19, 119 pp. (1923).—See C. A. 12, 1800, 2217; 16, 1468; 17, 2621; 3060; 18, 298, 1535, 1862, 2393.

E. J. C.

Gluten quality. C. B. Kress. Cereal Chemistry, 1, 247-50 (1924).—A gluten tester is described. In one operation the tester makes a curve showing the resistance to stretching, the distance that a gluten can be stretched before breaking, and the character of the break, whether gradual or sharp. The best judgment of gluten quality is found in baking or wet gluten test.

Ruth Buchanan.

PATENTS

Halogenated flour. W. Watson and D. W. Kent-Jones. U. S. 1,519,014, Dec. 9. Wheat flour is treated with sufficient halogen (preferably Cl) that at least 0.5% of the halogen combines with the flour. The supply of halogen is limited so as to avoid the production of a stick compound and the product is intended for use as a dough improver in making bread or other bakery products. For the same purpose, halogenated products may be prepared from other flours, starch, maltose, dextrin, albumin, etc.

Yeast food. H. Riley. U. S. 1,519,801, Dec. 16. A composition for use in bread dough to reduce the amount of yeast required and also partially to replace sugar in the dough mixture is prepared by cooking potatoes, wheat germs, maize germs, rice polishings, wheat bran, hominy, corn meal or similar material in H₂O, forming a decoction of hops with H₂O drained from the cooked material and adding the decoction to the latter after admixture of the decoction with wheat flour, adding yeast and molasses, permitting fermentation to proceed for several hours, and then adding NH₄Cl and CaSO₄. The product may be desiccated and kept in powdered form.

New Check-Ups on Your Flour

WHEN the American Institute of Baking, child of the organized desire of American bakers for a National home that would stand for them as a sign and symbol to American Industry that they were one of that family and knew their family responsibilities, one of its services was the Service of Testing for bread and flour quality.

The service was not opened commercially to make money, but culturally, to help all bakers to make better bread and thus fulfill more successfully their role in the world of providing the people's most dependable food.

Good will through good bread, being the only end sought, as a National gesture of the organized industry, the laboratory was free to do its best. Under I. A. Berg, its director, it sends each week scores of letters to bakers, telling them how to improve their formulas to get results. It analyzes flours for many bakers and some of them come in trick packages.

For instance, if you got four flour samples in four different packages, and knew that no two lots of flour ever came exactly alike, wouldn't you think that your analysis figures ought to vary a bit, one from another? And if you could shade things towards variability wouldn't you, as a chemist, be tempted to make little shadings in that direction?

One firm sent in four samples in different bags, all marked differently, so that Mr. Berg was confident he had samples of four different lots of flour. They were put through the apparatus in the test for ash and again in a test for protein. Identical results were obtained in every case. It seemed obvious the samples were from one and the same flour. But why four?

Without trying to solve the mystery the report was sent to the bakery. It informed the baker that the four samples were all alike—no difference at all. The ash content and the protein content was set down at a single figure for all.

In another similar case the samples were two in number instead of four. And an interesting letter came back in the course of days from the mills involved. It seemed that in these mills some millers were not yet "sold on science." They were no believers in the tests that the baker and the chemist can apply to flour to determine its baking qualities.

So they fixed up these "hoax packages." If the chemist should find them different—then the chemist would be shown up. First of all, tests were made at the mills and a record made of what their own laboratories declared to be the facts. Then many outside laboratories were chosen to be tested out by the same flour under different tags. From the mills came to Mr. Berg letters, one of which contained this paragraph:

"We are pleased to say that the American Institute of Baking service laboratory has sent us a report that corresponds exactly with our own report. Our samples were identical but were marked differently to give the laboratory the idea there were two different flours involved. We are sorry to advise the Institute that reports we have from other laboratories do not check at all with your figures and the figures from our own laboratory. We send out these samples for checking purposes."

That is the kind of a story the Institute likes to hear—more especially when it involves poor bread that can be made good or good bread that can be made better.

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Selling National Vision

HOW many bakers know that bread is not only the staff of life but the second greatest resistance builder against disease in the roster of this old world's choice foods? How many bakers know that one of the greatest public health authorities in America gives his six children all the bread they will eat every day — good bakers' white bread — so that they will build within their bodies an immunity against infections and organic diseases? This famous servant of the cause of Public Health is Herman N. Bundesen, Health Commissioner of the city of Chicago. Commissioner Bundesen calls on all the

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bakers of America to do him a great favor. It is to perform a public service by combining to advertise everywhere and carry everywhere the message that bakers' white bread is the great resistance builder — especially when this white bread is made of milk or eaten with at least one quart of milk per person per day. How shall the bakers of the nation be "sold" on this idea that a Health Commissioner brings

to the industry? How can they ever be sold on this or any other sound community idea if they are pulling apart in little factions—one baker thinking that his "class" of bakers needs no place in

a common council with other classes?

Commissioner Bundesen did not pose as any unselfish philanthropist when he urged bakers to make known much more generally than is now the case, the value of bread as an energy food in the diet. He scoffed the "vitamin bunk" of the brown breads, for he asserted the well-known truth that fresh vegetables and fresh milk have these in greater abundance than the body calls for, while white bread has energy in greater abundance than any of the foods rich in accessories, and it is energy foods that build up bodily resistance against illness.

In the program Commissioner Bundesen outlined as a call to the baking industry, there was a point where he expects to "get his." This great health authority said so frankly. Where he expects to get it is just here: As Health Commissioner, Dr. Bundesen keeps vital statistics. In the Spring of 1925 there were over 400 deaths in Chicago alone from "organic diseases." These signified bodily breakdown and this breakdown Commissioner Bundesen blamed onto lack of vital reserve. If the people who died and thus built up too large an average death rate had only eaten plenty of bread for energy and milk for energy, mineral salts, vitamins, and body-building solids, this death rate from organic diseases would have been a great deal smaller than it was. If it had been smaller it would have pleased the Health Department a great deal more. Therefore the bakers have a great public cause in their own hands. Every loaf of bread they can put into the American diet will be more health put into the human body, and that will mean more vital capital for America's toilers.

Now this appeal to the bakers to perform a public service by putting zeal and faith in bread behind the selling of it was made at a public dinner given by an interesting Chicago club. It is printed

here in what, to the editor at least, is an interesting magazine, owned by an industry and printed solely for its education and enlightenment.

Let us look for a moment to the streams that have joined before this little article—one among many of its kind—could be written—before Health Commissioner Bundesen could aim a message at the baking industry as a whole.

Streams that Join

First there had to be formed an organization. That was slow work. Scores joined where hundreds were needed. The first few hundreds combined to build an American Institute of Baking. Thousands scoffed to one who would support the idea but the few who had been sold a national vision had their way and, as pioneers always do, they carried the burden alone for the good of all—joiners and slackers alike.

To voice the common vision all had to work to—and get a common fund of knowledge into the hands of all in the breadstuffs industry, whether as flour men, machinery men, supplies men, bakers, or wheat growers, it was necessary to have a central broadcasting station. That was set up three years ago in the form of this address, pictureless paper, meant merely to be a source of material for all other papers to take from every word that appealed to them.

This paper worked on for three years, catching such new drifts and new ideas as it could and setting them forth. There came a day when it was determined that flour men, bakers, supplies men, and men of allied industries must know each other personally, and must learn the common language that comes out of seeing in common the vision of breadstuffs pulling the central load of edibles to the well regulated home table.

The Dough Club of Chicago was the result of this impulse towards education.

John Hartley, one-oven baker, and Julian Livingston, a larger baker, came equally to its board. The Dough Club learned the problems of the flour men as Hon. Sydney Anderson saw them. It learned the problems of allied industries as milk men, meat men, butter men saw them.

Finally there came a day when it could command the time and attention of Health Commissioner Herman N. Bundesen. He was invited to speak before it. With the editors of the trade press and members of the staff of the American Institute and men in every line of baking activities for his audience, Commissioner Bundesen launched into an apostolic sermon on the things bakers owe it to their communities to do.

At the Dough Club

Commissioner Bundesen had been watching for years the decline of bread in popular favor as other manufacturers urged their canned, dessicated, packaged substitutes. He had seen unscrupulous propagandists rushing the "vitamin craze" into service in the denunciation of white bread. He knew that white flour saved all the energy food of the wheat kernel and gained over fibre-full bread enormously in appetite appeal and palatability. And his heart was full of disgust for the palpable lying of the detractors of white bread. With the 400 deaths from organic diseases on his mind, and using them for a text, he began to chide the bakers for backwardness and silence when they had the best message of all that could be seeded down and implanted in the minds of the masses of the people.

Here are some of the assertions by which he "got his message over" to the industry.

"We all take for granted that bread is the staff of life. But we hear too little by far about this in recent years. They cut down the bread ration during the war and have kept it cut down since in

hotels and restaurants. And as the bread ration goes down the deaths from organic diseases go up.

The Peple's Life

"What does this high death rate from such diseases mean? It means that the people have expended their health reserves. The average man of to-day is just pegging along. Without reserve power he can just carry the daily stint. If a hundred average business men should have to run up stairs three flights most of them would arrive at the top flight ready for the coroner's services. The old heart would not stand that much of an extra load.

"That's what cutting down on bread and milk has done for us."

The Case for Milk

Dr. Bundesen held up a book he had issued from his Department about milk. He said he issued it in the interests of a lower death rate. It asked all people to drink at least a quart a day. He said he wished he could have the bakers drive home the message that with the milk should go a pound of bread. He wanted this done sensationally, dramatically—with challenging force.

He described the case in which he ran a locomotive for 12 miles on dry milk powder. He said he did it to dramatize to the people that milk was fuel and energy. He said that he could heat a great building or run an elevator on bread just as well and that he would not be at all adverse to trying such a dramatization of bread's place as the great fuel builder.

Of his six children Dr. Bundesen spoke with great pride. He mentioned that he always fed them bread and milk—all they would eat. And then he was indifferent about the germs with which he had to associate in his daily work. He

knew the children were immune through a body reserve of health-compelling energy.

He urged the bakers to use milk in their bread—making the loaf of bread the great reserve milk bottle of the nation, since so much milk was now wasted after its cream and cheese content had been taken from it—leaving its priceless solids of mineral nature to be thrown away.

How to Proceed

At this point Dr. Bundesen came to the issue on which the baking industry has always halted. Other industries were so organized that one general manager, selling their product, could take out, before making returns, a central advertising fund. The baking industry had brought no fund into existence yet for advertising bread's virtue. Yet here was an issue calling for joint action, as so many had called in vain before. He wanted to see a card slipped into every loaf telling why it is the staff of life and the reserve building food of the body.

Couldn't the industry work conjointly to have such cards go out with their product?

And the Buffalo Answer

Can the industry work conjointly for such an end? Obviously, not without getting together in common council and approving a plan on behalf of the industry. The next "get together" moment will be at Buffalo, September 14-20, so of course Commissioner Bundesen's message was a call to come to that convening of bakers and bakery issues. It may be that at this convention that great unscaled Mt. Everest of Bakerydom—the idea of joint action in advertising—may be worked out and reduced to a practical form which may mean to all bakers, "Let's Go."

Commissioner Bundesen was given a

rising vote of thanks for his efforts. As bakers start up the business of thinking about his message they may keep in mind that he, too, is thinking about it and has a very alert interest as a man looking for better vital reserves in the city multitudes. He chided the bakers for one thing. At their own luncheon they ordered very little bread and accepted many substitutes—especially for dessert, when bread pudding made one of the finest desserts that could be put before a diner. He insisted that a baker should believe in his goods so much that he could not eat anything but a bread pudding dessert. That was the measure of his own faith as Health Commissioner. And he spurned coffee—and took a glass of milk with his lunch.

In Re Buffalo

We bakers of New Zealand and Australia recently had the pleasure of hearing from Mr. T. Passfield, who has made a tour of the States. From what he tells us about the advance of American baking machines, our customs here are a bit behind the latest wrinkles in practice there. We hope to have a delegation over to the Buffalo exposition to see about this.

—J. Heaton Barker, Secretary the New Zealand Master Bakers and Pastrycooks' Ass'n.

Welcoming Visitors

As we are bringing to a close the 1924-5 program of special Wednesday night entertainments for bakery visitors, we want to state that they have been of great benefit to all of us. Considerable extra work was involved—extra night work on the part of our salesmen and others—but we have the satisfaction of knowing that our job has been well done.

—F. A. Schoenlen,
General Manager of the Log Cabin Baking Co., in a bulletin to his associates.

The Phone for Food Movement

*It Gives Wholesale Bakers a Chance to Cooperate with Grocers
for the Benefit of Both*

NEARLY all modern changes in household affairs are responsive to woman's desire to get out of home drudgeries and possess herself of leisure for other affairs.

The modern baker came into existence on this impulse, which was in turn born of the complexities of modern life and the fact that the woman in the home now has a choice of a hundred things to occupy her mind and time to one that formerly was within reach.

Her purring motor waits to take her to the civic association, from which she formerly was excluded through the pressure of life within her kitchen.

The telephone brought the woman outside contacts. Calls come over it that absorb her time. Shall she 'phone for her food, including her daily bread? The idea got started a few years ago and of course everybody picked on the 'phoning housewife as a sinful slacker. Just so the same agents of Age picked on the youthful wife who bought her bread instead of baking it.

Perhaps the grocers themselves did not appreciate the orders that came over the 'phone. The grocer saw the housewife taking her watchful eyes off him, and perhaps rewarded her with shelf-worn goods, bad cuts of meat and cheese, and vegetables not just exactly in their prime.

But the chain store came in with special advantages for the woman with plenty of time and nothing to do but shop. It brought this woman to the chain store to carry home her basketful. The grocer, in the meantime, had a great potential source of trade within his store and did not know it. This potential source of trade was the telephone. What if a grocer could get a

reputation for reliable trading—for honesty in 'phone orders, such as the food cooperators got for food packed in co-operative packing plants—by never slipping over a bad one—whether it was eggs, oranges, lemons, raisins, or tomatoes that were being packed?

The National Wholesale Grocers' Association caught the vision of the way the telephone might be put into use between the housewife and her grocer. It saw that first of all the grocer had to believe in his telephone and in the order that came over it, and the right of the woman behind the order to be well served without inconvenience to herself. Next it found that convenience in the shop in getting out a telephoned order as compared to time lost discussing with customers their verbal orders, made orders over the telephone cheaper to deliver than any other kind received. It saw that a real salesman had to be on the receiving end of the telephone.

These matters the Grocers' Association has worked out into a great National "Phone for Food" campaign. It is to build up the grocers by making them better merchandisers.

Where does the baker come in? Grocers have long held that bakers should know them better as the real merchandisers of bread, since they pass it along to consumers.

Here, then, is a chance for wholesale bakers to help their grocer friends. They can carry the literature of this campaign in their own advertising and can include cards about it in their wrapped loaves. Bakers who are interested can gain full information from the National Wholesale Grocers' Association at 6 Harrison Street, New York City.

BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

I. K. RUSSELL, Editor

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APRIL 15, 1925

We Work Together

To win through knowing our markets and developing their full potential possibilities, a higher place for the baking industry in the great family of America's business life.

The Baker's Debt

I AM trying to think at this time of the picture before a baker who is just starting in business today as compared with that of fifteen years ago.

The most important things for the baker to consider these days in starting his new business are what machines he will buy and how he will merchandise the product of these machines. Fifteen years ago it was an oven to bake the goods in and the employment of bakers to do the work. Once the machines have been purchased, they will do the production work by themselves. An electric push-button today replaces the muscle work of fifteen years ago and a conveyor belt takes the back-ache out of the bakery. The wise baker is the one that keeps his hands out of the dough—stays away from the dough and turns his heart, his mind, and his hands toward merchandising problems. It is here the battle lies and it is here that victory awaits the better merchandiser in any center of trade conflict. It is for this very reason the bakers

serve themselves advantageously when welcoming the salesman from the machinery house and finding out all that he has to say for himself and his new model machine or newly invented equipment. Because of this condition every baker, whether a one-oven man or a dozen-oven man, can make of a trip to Buffalo in September an asset rather than an expense.

At this coming convention will be all types of new machines, and improvements on old types will be on display, so that observing bakers can see where the trend of the industry leads and can gain that mental vision, without which, a noted religious leader tells us, "the people perish." In the next decade many hundreds of bakers will perish because they lacked vision and a desire for modern ways in modern days.

The greatest strength against increased competition today for every baker is the power of modern machinery. How many bakers are without life insurance today? Very few. A trip to Buffalo will furnish life insurance to any baker against the withering that comes from a dearth of ideas.

My idea was born to me at Chicago last month, during the meeting of the bakery engineers, wherein nearly every word spoken in their four days of constant application to bakery production problems had to do with the management of bakery machines. These production men knew where secrets of good production lay. It is needless to urge or invite them to come to Buffalo. They know that an opportunity of seeing, housed within one building, the very latest word and the very latest idea in bakery machinery and equipment, is worth traveling to Buffalo from the most distant corner of the United States. Is the average baker going to miss the opportunity that will be his next September?

LEWIS F. BOLSER, *President.*

Why We Labor

WHY do men who might find labor enough between their dough room benches and their front doors to absorb their ambitions and their time, give their hearts and their hands to the building of a great Exposition at Buffalo next September? Some will think that a narrow lust for profits is back of it all, but they know little of the deeper and sounder instincts of life when these instincts are guided by intelligence.

Henry Stude of Houston, Texas, drops this little thought to us in a letter, quoting Herbert Spencer:

"The citizen who devotes his energies wholly in private affairs, refusing to take part in public affairs, pluming himself on his wisdom in minding his own business, is blind to the fact that his own business is made possible by the prosperity of all."

Herbert Spencer there wrote what Col. Roosevelt said when he pointed out that every man owed something to the profession or the industry of which his life was a part.

In our industry those who are making themselves happy by rising to the full possibilities of their service in their industry are now planning to go to Buffalo or helping to make that Exposition and convention series the greatest it can possibly become. Thus they are helping to carry forward the place of the Baking Industry in the great family of industries.

As Science Leads

TRULY have our leading editors and writers come around to the view that in the laboratories of today, tomorrow is being carved out for us.

During the war, W. Lee Lewis invented Lewisite—a deadly gas. He saw the need, after the war, of a less deadly brother of it for police work, and he invented tear gas. It now works for all police depart-

ments everywhere. The latest application of it is to put a supply in policemen's clubs so that they may easily subdue tough customers and reduce them to weeping supplicants.

In Washington, Vernon Kellogg, secretary of the National Research Council, was discussing with friends the value of Institutes such as that the baking industry has reared for a National home. He noted that research chemists, working with corn and with other sugar sources, had developed a new sugar chemically identical with the sugar that once was obtained only from cane and later from cane and beets. But the work of the research chemists had to be tested in laboratories for each industry where the new sugar might find its way into service. Holding up a copy of *BAKING TECHNOLOGY*, he showed to his fellow scientists how the baking industry had done this and had thus opened the way for a scientific development to work its route into industrial usefulness.

The research work done here on this new product is only one of many pieces of work under way. Often bakers are found who pit their guess-so knowledge against the laboratory story, but the beauty of the latter is that one can always invite them in to go over the data once more and see for themselves what is the truth. Under the laboratory method there is little chance left for falsehood and the falsifiers.

If the Army Paid

THE *Christian Science Monitor* and other papers are becoming very excited because the dwellers in army posts who can obtain their supplies at cost receive their bread for 2 cents per loaf. They want the people to build "private" bakeries and do the same for themselves as the army does for its own. To gain a fair view of the folly involved please read the article on this theme in this number.

As to "Whole Grain Wheat"

How Foolish Propaganda Assertions of Food Faddists Affront Well-Tested Facts

BY DR. H. E. BARNARD

WHEAT is Nature's best cereal. In the form of bread it justifies its universal acclaim as the staff of life. But it has remained for a Chicago company to exploit wheat, cooked in a tin can as a therapeutic cure-all. Of this product, C. H. Woodward, editor of a curious house organ called "The Motive," says: "More than seventy-four ailments have responded to the regular use of Whole Grain Wheat, because it complies with the law of life, being able to restore to the blood each of the sixteen elements extracted hour by hour by the life-cells, and restore them in balanced-relation."

This record of Whole Grain Wheat achievement is explained by a definition of disease which in its simplicity challenges the whole line of medical investigators from Hippocrates to the latest interne. "Disease," says the erudite Woodward, "is merely altered function, and altered function is due to the use of denatured food, denatured water, denatured air."

And then the amazed reader, as the solicitous friend of some sufferer "from indigestion, acid stomach, asthma, goitre, constipation, palsy, high or low blood pressure or nervousness," or who knows "a child who is backward in school, slow in growth, or troubled with bad teeth, or some one who is in a run-down condition generally," is gently led to the "potent food" whole grain wheat in its supreme nutritional effect."

Every boy endows his dog with all the virtues of the canine race. His parents see only a flea-bitten cur. The boy's de-

votion to his pal is matched by C. H. Woodward's supreme faith in Whole Grain Wheat. But we are constrained to wonder if the use of every advertising device which ever pushed patent medicine into a temporary success in stimulating the sale of a simple food, old as man himself, is so much due to devotion to the product as to love of the profits which so easily and naturally flow Woodwardway through the sale of a whole wheat worth today on the Chicago market \$1.86 a bushel, tinned and cooked at \$41.66. Farmers often express amazement at the spread between the value of their crops on the farm and on the consumer's table. No roe from a Potomac River shad ever graced a caviar canape with a more extravagant appreciation of commercial values than wheat converted by the alchemy of hot water into Whole Grain Wheat.

And yet, in spite of the quackery employed in exploiting it and the disgrace it suffers in going to the consumer burdened with more scientific crimes than were ever committed by the advertising managers of Peruna, Liquozone and Piso's Consumption Cure, Whole Grain Wheat is a wholesome, palatable food, quite suitable for use by those who like that kind of food. Its virtues are mild ones, to be sure, but we point to them with pleasure, if not with pride, for it is from wheat, perhaps drawn from the same bin that the flour is milled, which, fortified with milk enriched with fats and sugars and vitaminized (if we may modestly borrow a word from the glossary of Woodward the Scientist) by yeast, in the form of white

bread, graces 25,000,000 American tables three times a day.

Analysis of Breads

And that its wonder-working elements may be correctly measured, we set them out beside those of a loaf of bread:

The analytical work here reported was done by W. C. Luckow.

	"Whole Grain Wheat" Lot No. 6989	"Milk Bread" Lot No. A
H ₂ O	69.90%	38.00%
Ash	0.98%	1.61%
N X 5.7	4.14%	8.61%
Fat	0.70%	3.20%
Cr. Fiber	0.83%	0.22%
N-free ext.	23.45%	48.36%
CaO	0.03%	0.12%
P ₂ O ₅	0.29%	0.46%

A study of these figures is interesting. Whole Grain Wheat eating is urged because it is not a denatured food, yet the chemist's report shows just four times as much lime in milk bread as in the exploited whole wheat food. These lime figures are of special interest in view of the fact that Woodward, the pediatrician, in his analysis of Secretary Weeks' statement that the nation suffers a yearly loss of \$1,500,000,000 due to preventable disease, points out that "Defective teeth demonstrate that some fundamental deficiency is being created by each living being." It may be that Woodward, the dentist, is concerned over the lime content of Whole Grain Wheat, for according to Sherman a growing child requires over a gram of lime a day. To secure that amount a child would have to eat more than eleven cans of Whole Grain Wheat a day. Only Woodward, the mathematician, can reconcile this fact with the label's statement that one can will serve four people.

The Protein Content

The protein content is twice as high in the bread as in the wheat, the fat content

four and one-half times as great, the starch content twice as great, the phosphate content half as high again. The only superiority of figures shown by the Whole Grain Wheat is in the water content, which is 69.90 per cent, as against 38.00 per cent, the normal content of bread.

With true charity we assume that the water which swells the normal moisture content of wheat as it may be bought at any feed store by any one who wants to join the chickens in their delight for cooked wheat, from 12.0 per cent to 69.90 per cent, is not of that inferior type of water so aptly described as "denatured" by C. H. Woodward, the sanitarian, in his classic exposition of disease causation.

But one cannot refrain from marveling at the magic by which $3\frac{2}{3}$ ounces of wheat, soaked in $7\frac{1}{3}$ ounces of undenatured water, increases in value from $\frac{8}{10}$ of a cent to $16\frac{2}{3}$ cents wholesale when placed in a tin can and labeled "the contents of this can sufficient to serve four people."

Watered Wheat

Surely it cannot be the water that enhances the value so enormously, for water at the kitchen tap, supposedly undenatured, though not guaranteed, as is the canned water in whole grain wheat, costs only 9 cents a thousand gallons. This label must be the magic worker, for nothing has been added to the wheat berry nor taken away. Does it not say on the label: "Whole Grain Wheat contains every mineral element in the wheat berry, including the vitamins?"

Nutrition authorities have in the course of many years of study of the science of nutrition established certain facts. They have, for instance, found that the human animal eats food, burns it in his body and metabolizes it into energy and muscle and bone. Food is the fuel which keeps the

home fires burning in every body. And it takes a certain amount of fuel to stoke the fires. For convenience sake the unit of fuel is estimated not in tons, like coal, or cords, like wood, but in calories. And all fuel, whether it is coal or wood, or Whole Grain Wheat, or milk, or bread, contains a definite number of calories to the pound. The fuel value of food is measured by its caloric content. A pound of Whole Grain Wheat will furnish about 530 calories or heat units. A pound loaf of bread will furnish from 1,100 to 1,200 calories, more than twice as much. But a pound of bread costs 10 cents a pound retail, and a pound of Whole Grain Wheat costs 24.14 cents wholesale.

Quackery in Claims

It is obvious that whole grain wheat is not an inexpensive fuel, in spite of the fact that it "is just the Whole Grain of the Wheat," to which "nothing has been added but water and salt and nothing taken away." Woodward, the financier, knows how wheat plus water, plus can, plus label, becomes worth more than \$40 a bushel. We do not. Our analytical data throws no light on the subject. What will the rats tell us?

The best way to determine the real worth of a food is to eat it. But human tastes differ. Some like Whole Grain Wheat, others do not. Rats, though, are pretty much alike; they live normal lives; they grow almost with mathematical precision; they are the ideal animal with which to study the role of foods in nutrition.

Prof. Shaw's Report

So in the Nutrition Laboratories of American Institute of Baking, Roscoe Hart Shaw is studying the real worth of many foods. And among these foods he has studied Whole Grain Wheat and whole milk bread.

The laboratory report follows:

The feeding test was conducted in the conventional manner. Young rats were selected in their vigorous growing period and were confined in individual cages of the Osborne type. In addition to their diet there was always before them a supply of clean drinking water. The rats were under frequent observation during the test and were weighed at regular intervals, the weighing so obtained forming the points on the accompanying chart.

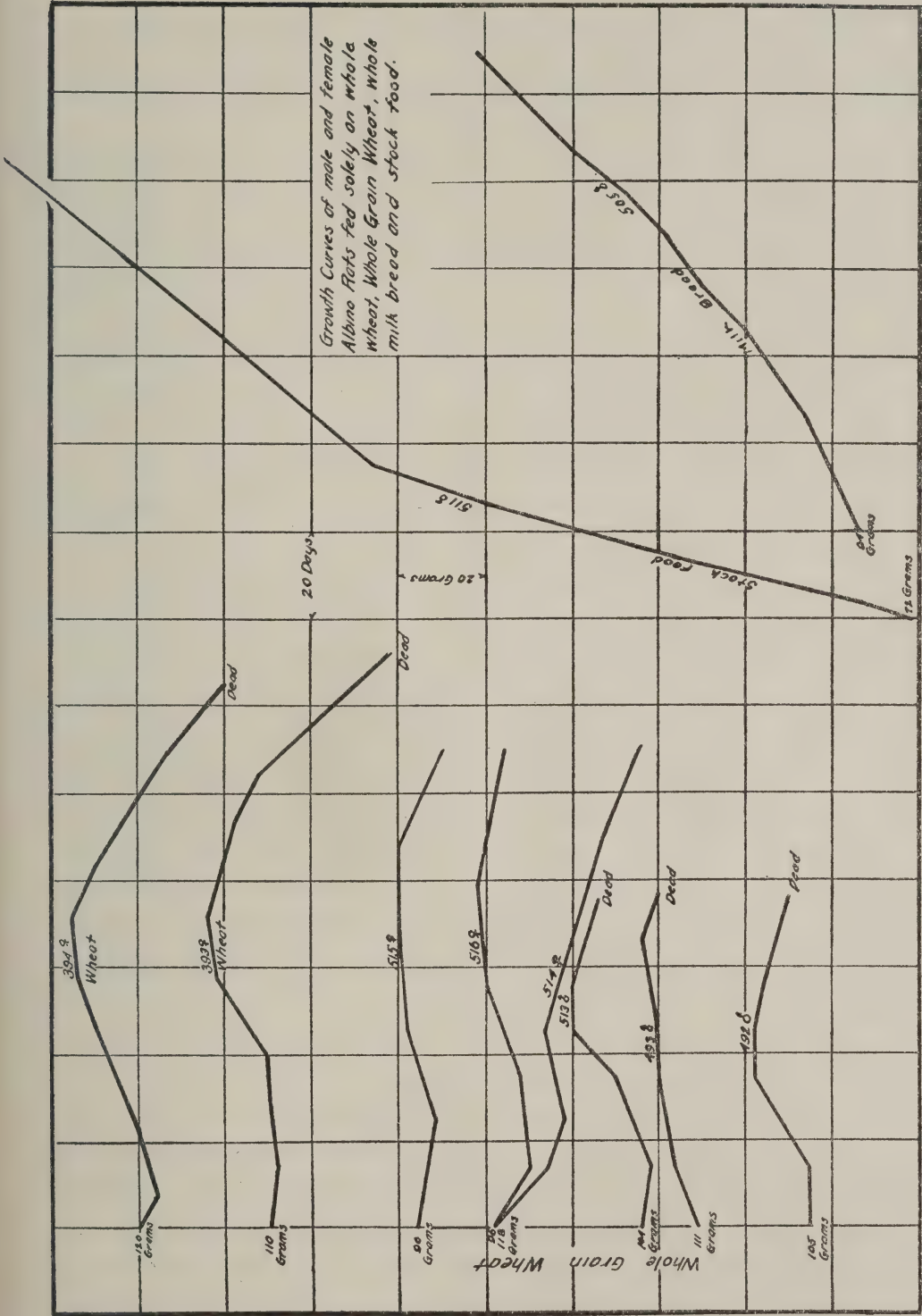
The feeding test was designed to compare directly the nutritional value of whole grain wheat with 8 per cent milk bread, which corresponds to bread in which whole milk is the sole liquid ingredient, and with our laboratory stock food, which consists of two parts, by weight, of dried bread crumbs and one part, by weight, of powdered whole milk. This stock food may be considered as bread supplemented with milk.

In connection with another experiment, we had already carried out a feeding test with whole wheat purchased at a feed store. For the sake of comparison, growth curves of these animals are placed on the chart with the others.

The Whole Grain Wheat was fed according to the directions on the can; that is, as soon as the can was opened, the contents were placed in a glass receptacle and kept in the refrigerator. It was never kept more than two days after being taken from the can.

It will be noticed from the growth curves of the rats on Whole Grain Wheat and on ordinary wheat that they made no consistent gains. A slight fluctuation may be noted from point to point, but it may be concluded that the wheat did not supply all the elements required for growth.

Male rat 492 started at 105 grams and died 77 days later weighing 110 grams.



Male rat 493 started at 111 grams and died 77 days later weighing 120 grams.

Male rat 513 started at 104 grams and died 76 days later at 114 grams.

Female rat 514 started at 118 grams, consistently lost for 110 days, when she weighed 84 grams.

Female rats 515 and 516 maintained a fairly uniform weight for the same length of time. These last three rats are now apparently near death.

Female rat 516 showed slight symptoms of eye trouble. With this exception no special symptoms of deficiency diseases were noted except the roughness of the fur, anemic condition, and a general appearance of being out of condition.

It must be concluded from the above feeding test that Whole Grain Wheat lacks some of the essentials necessary for growth in young animals, being in this respect a far inferior food to milk bread.

It may be inferred from this report that because the rats which served as the subjects in this investigation died a lingering death, Whole Grain Wheat killed them. No, no more than apples, or potatoes, or even butter killed the test animals which found it impossible to live on those excellent foods.

Broadly speaking, the rats starved to death because their foods were incomplete, lacking in certain essentials which are necessary to proper nutrition.

And human animals, fed on the same restricted diets, would go through the same experience as the rats, and come to the same sad end. That's the reason why our diversified diet of bread and milk and meat and fruits and vegetables is the best diet. It is the best because it is balanced, because the deficiencies of one food are made up in another, because our natural instincts, ranging through the variety of foods on the average American table, find these and put to use enough fat, enough starch, enough protein, enough minerals,

enough vitamins, enough roughage, to keep us normal, healthy, happy human beings. And for that part of the human family that is unnormal, unhealthy and unhappy, the science of medicine offers a genuine relief, not by drugging, nor by starving, not by strange diets, but by the rational regulation of the chemistry of the body after an intelligent diagnosis has determined the reason for the ills.

No food manufacturer has a right to take his product out of its natural place in the ration and exploit it as a cure-all. No food is worth more than the measure of its ability to build the body, to furnish energy, to activate the body cells.

By this appraisal, Whole Grain Wheat is as valuable a food as whole wheat cooked in water until it is soft—and no more.

Wheat and Politicians

In my opinion the best way for the farmer and the Department of Agriculture to help the flow of wheat off the farm is to do all they can to popularize baked products made from wheat flour. The politicians use the farmers' troubles for ammunition. It would do them just as much good, and the wheat farmers much more, if they would drive some of these silly would-be reformers of the American diet out of the newspapers. The Institute is doing a great work. I hope you keep its lamps well trimmed and full of oil.

—E. D. Strain, Battle Creek, Mich.

Hopeful

Please give us a score on two samples of our plain-top bread which we are sending by parcel post to-day. We are strong for quality, but fear there is room for improvement in our product. We have two boys now studying at your school and hope when we get them back to make things move towards the highest possible grade of output.

—Charles Grottendick, Fairmont, W. Va.

The Army's Two-Cent Bread

How this Famous Product is Baked without Expense charged against it for any Baker or Bakery Costs

TAKE it from the newspapers and what this nation needs is bakeries like the army has. Yesterday it was Henry Ford's Dearborn Independent that declared army bread at 2 cents a loaf and sold "at cost" was the finest example of social efficiency it could think of. This paper pilloried the baking industry by inference for not doing as well.

Today it is the Christian Science Monitor. In a well-reasoned editorial the editor of the Monitor calls for army bakeries for all America because two-cent bread "at cost" suggests to the Editor that bakers are gouging the public and making it pay "all the traffic will bear."

What are the facts? Read the Monitor's editorial and the letter below sent in reply to it. Here the real facts are brought out, and they suggest the enormous need for constant education of the public into the conditions of modern bread baking.

Farmers are as ignorant as the Editor of the Monitor shows himself to be. And they need the contact that only educational matter prepared by those who know our industry can give. Instead of army bread being "at cost" it here is shown that army bread is baked by a baker on an army salary, not a cent of which comes from the baked product, with help all of whom work for army pay, paid on another account than the bakery's, while the bakery is furnished free, fully machined and fully manned, and stands on tax-free ground, relieved from all official supervision and license fees. The "cost" involves only the car-load price of flour and is arrived at as an item in dividing the soldier's ration money. Could the same

story appear more different than it does in the Christian Science Monitor's version and the version obtained at Army Headquarters by the American Institute of Baking's staff?

The Editorial

The Christian Science Monitor's editorial reads:

Uncounted thousands of city dwellers in the United States who were reared on farms and in villages no doubt remember when the cost of a loaf of bread was so small that it was hardly considered. It was so small, in fact, that it was almost impossible to estimate it. Flour made from wheat grown on the farm, mixed with milk from the farm dairy, leavened by yeast from a jar always well filled, and baked by heat produced from wood which cost nothing but the labor necessary in preparing it, produced a tempting loaf whose total cost probably was not more than a cent. These same former farmers, or sons and daughters of farmers, together with their city neighbors, now pay their grocer or other dealer from 10 to 15 cents for similar loaves, say from 1000 to 1500 per cent more than the estimated original cost of the farm-produced loaf.

Soon after bread prices were advanced during the war period, consumers generally supposed that with the passing of the emergency the former price level would be established. Five cents was regarded as a fair charge for bread, it being assumed that the difference between that price and the actual cost of production would afford a reasonable profit for the baker and the middleman. But the former schedules have not been re-estab-

lished. It seems difficult, once a commodity has been advanced, to restore it to its original economic status. It is realized, of course, that the overhead cost of production and distribution has been greatly increased. But the fact remains that the price of bread is not fixed upon the basis of its cost so much as by what can be obtained for it.

It seems that at commissaries and supply depots operated by the Government, where those employed in strictly governmental activities are allowed the privilege of purchasing food and some other commodities at cost, bread is sold at a uniform rate of two cents a loaf. Estimating this as actual cost, the margin left to the commercial baker and retailer represents, on a twelve-cent loaf, 600%.

The way out for those who object to paying this seemingly large tribute is easily found. The remedy would be for them to establish their own private bakeries and to make their own loaves. But that is hardly the point. Modern apartment houses, or at least many of them, are not adapted to what is called "heavy" housekeeping. And besides all this, the tendency is away from that sort of thing. It may actually be as economical, in a small family, to buy bread at the high prices charged as to attempt to make it at home. What should be considered is the apparent unreasonableness of the price charged. It is not enough to defend it upon the ground that the people would rather pay it than to go without bread. The fact to be established is as to whether or not a margin of 600 per cent between cost and selling price is too high.

The Answer

In reply the following was sent to the Monitor:

The Editor,

The Christian Science Monitor:

One of the most interesting editorials

that has come to my desk for a long time is yours of March 24, based on the price of a loaf of bread. It is well reasoned, as you look from the consumer's table back towards the source of your loaf of bread. I take it that in all fairness I, who am looking forward from the source of modern loaves of bread towards the consumer's table, may write you in good will and fellowship about your statements of facts and conclusions.

If I may, then, without anger or resentment against statements that it is hard to remain patient with, unless humor comes with its saving laugh, I would like to take up the matter of that 2-cent army bread.

You picture folks who are enabled to buy food at cost in army camps as obtaining bread for 2 cents a loaf. And from this you argue that the commercial baker must be gouging. And from this you argue that the answer, apparently, is private baking concerns or some kind of baking concerns that take the control of price away from folks who seem to be driving for all they can get—and letting what the traffic will bear make the price.

If you were only on the inside, so much would be visible that is not. But let us take this army bread episode. Thousands of lay writers have taken up that point and have expressed conclusions just like yours. So you are not alone by any means. The industry has grown slowly and steadily—much more slowly until the past few years than its sister industries—under a constant drum-fire of writing like this.

To bring your point out very clearly may I repeat that you state that "estimating this (the 2 cents charged as cost price for bread at army cantonments) as the actual cost, the margin left to the commercial baker represents on a 12-cent loaf, 600 per cent. The way out for those

paying this seemingly large tribute is easily found."

Now, from my own desk in the headquarters of America's baking industry, may I tell you that dozens and scores of investigators have started right at that point and have ended up with investigations that revealed bakery profits of never so much as 1 cent per pound?

The State of Wisconsin started out boldly to find bakery pillage—and found the profits to be from $\frac{1}{4}$ to $\frac{1}{2}$ cent per pound on bread, with a single exception where the baker had a profit of nearly 1 cent.

Now let us check this back to that army situation. In Chicago is the chief flour buying center for the Army and also the School of Subsistence where the books are kept on army costs. Major Robert Littlejohn, a remarkably intelligent and alert officer, is in command. At the American Institute of Baking, where I am writing this, is a School of Baking. Our instructors frequently lecture at the Army School and the Army lecturers frequently lecture at ours.

At one such joint meeting I submitted to Major Littlejohn this statement of yours. It was then made by Henry Ford's Dearborn Independent. Major Littlejohn made an explanation that ought to appeal to all fair-minded and reasonable people. It ran like this:

"In the army we have many accounts. One of them is for flour. Others are for lumber. Others are for paint and iron-work. We have to divide the factors of the soldier's ration according to the total amount of cash allowed per day for ration. In the system of book-keeping that brings the cost of bread out at 2 cents per loaf, nothing whatever is counted but the car-load price of the flour entering it and the little bit of yeast used.

We pay cash out for the flour and check this off to the soldier to whom we issue that flour, as baked bread to balance the ration fund.

"Now as to the bakery in which it is baked, that is on tax-free ground. It is built by the quartermaster and kept up by him. Not a cent out of the value of the loaf as we rate it goes into bakery costs or overheads. The quartermaster is always on call to repair, paint, enlarge, or rebuild the plant. And the cost goes to other funds entirely.

"It is the same with personnel. We do not hire any service chargeable to the bakery. The hired hands are soldiers. They work for their pay as soldiers. And the guard house is there for them if they do not do all that they are ordered. If one gets sick the enlisted personnel gives us another."

It is needless to add more. The beneficiaries of the army bread price do not carry the sustaining costs of baking and delivering bread. Under similar conditions the baker would be baking bread in a way that violates all American methods. The state and city would provide land tax free and delivery wagons price free. They would build and provide bakeries and equip them, instead of sending around a young army of license collectors, labor inspectors, sanitary inspectors, and what not to get free board, among other things, off industry. The baker would have nothing to do but to count the loaves as made and draw his salary from a public fund outside the shop.

So you see the "obvious way out" is not so easy when you come to get the true measure of the picture.

Very truly,

I. K. RUSSELL,

Editor, Baking Technology.

Children and the Bread of Life

*Organized Baking Industry May Find Big Role to Play
in Child Welfare Work*

THE world's chief asset is the children of today. As they grow and learn and take their places as worthy citizens, a better world is made and the heritage of those who come after us will be enriched. These children around us, the 20,000,000 of them who are still sleeping in their mothers' arms, or who in our schools are acquiring the means with which they will shape their future, are the raw materials from which society is being built. Not so much material is spoiled in the making as in earlier years. We have learned how efficiency profits us in our shops and we are more careful in the shaping of our children. There is not so much raw material, it is true. The birth rate is steadily going down. But the babies who come to us are not wasted by neglect or sacrificed on the altars of ignorance so much as formerly. At least the infant death rate is steadily going down and year by year more infants come unscathed through the perils of birth and babyhood.

Just how does the baby interest the baker except as he comes bringing joy into the family? And where does the baking industry find a common interest with American Child Health Association in saving babies and in protecting them in their adolescent years? Of course, every one wants to help the baby, and as May Day comes as the peak day in the Association's year-long work for happier childhood there will be no unwilling hands among the bakers, but the questions "Why May Day?" and "How may I help to make it mean more to the children?" do demand an answer.

When Herbert Hoover closed his work

overseas, the greatest humanitarian work of all ages, by which he saved the lives of millions of children whom a cruel and uncivilized war had denied the right to happiness and even to life itself, he brought home with him the best machine for organized charity ever built. It was made up of the men and women who had done such noble work in devastated Europe and who had spent with complete efficiency \$700,000,000, contributed by our people, in saving the children who were the only hope of a new Europe. "How," asked Mr. Hoover, "can the experience of these trained workers better be turned to account than by organizing in our own country a national movement for Child Health and through it using the lessons of our European work in building a finer citizenship for ourselves?"

Of course, there was but one answer. The Association was organized, with Herbert Hoover as its President. And under its skilled leadership and with the help of its efficient departments, child health work is making rapid progress. The Association aspires to no leadership save as it can serve the more efficiently. It leaves to state and city health departments and to organized effort everywhere the carrying on of all constructive movements which in any way help the child. But its special effort, aside from the systematic researches which are constantly under way, finds expression this spring in the May Day Festival.

In the working out of the program every child lover had his part to do; every organization, its program to carry out, every industry which in any way

touches the child, its opportunity to contribute.

The Baker's Interest

And no industry is more interested in children than the baker's. Children need bread. The baker through his products may contribute much to their sturdy growth. Milk, grain products, vegetables and fruits form the chief part of their diet. The baker's perfected loaf of milk and flour, together with vegetables and fruits, is a big factor in developing the child's body. It provides a large part of the energy for active, happy children in an economical form. His responsibility to the children is great. And his appreciation of that responsibility measures his right to recognition as the leader among the servants of mankind.

May Day is almost here. How can the baker take a real part in observing it? Here is the thought of American Child Health Association:

The baker can help us by:

- (1) Offering his services and his support to the local committees who are planning May Day programs.
- (2) Decorating his windows and placarding his wagons with anything that is significant in relation to child health.
- (3) Inserting in bread packages leaflets and other material which tells the mother how to care for her child.
- (4) Making for May Day bread with 100% milk in the formula and through educational advertising explaining the need of children for a well-rounded diet, rich in milk, in fruits, in vegetables, in cereals.
- (5) Applying to Mrs. Aida de Acosta Root, Director, Division of Publication and Promotion, American Child Health Association, 370 Seventh Ave., New York City, for educa-

tional material to be used in celebrating May Day.

- (6) Arranging, through suitable methods, for distributing informative material prepared by the Association and available throughout the year.

Here is a program for every baker to make his own. By taking an active part in it he will do a splendid service to children everywhere and he will hold up the hands of the thousands who are working to make this old world easier to enter and happier to live in.

Concerning the Institute

I WOULD like to have several hundred copies of Baking Technology for February 15, to distribute to bakers. I would like to give every baker I come in contact with a chance to read what W. E. Doty there says about the Institute. Reading that article should take the conceit out of a great many bakers and cause them to see in the Institute the hope of their Industry. Doty had had as much experience as any baker could get in the shop, yet he found the course of enormous value to him. And so it would be to every baker who has not had it. If the day comes when we have only intelligent bakers, then they will not be so ready to blame the flour when they have not found its correct fermentation period.

—S. I. Bagwell, Salina, Kansas.

We learn from Mr. Robert Whympers of his very interesting visit to the American Institute of Baking, and especially to its school. We have been very interested to read his letter describing your many excellent activities.

—H. G. Freeman, British Arkady Co.,
Skerton Road, Old Trafford,
Manchester, England,

For a Larger Use of Bread

How Baking Industry by United Efforts Can Drive Home Value of their Product in the Diet

BY DR. H. E. BARNARD*

Director, American Institute of Baking

THE basic laws of economics apply to the baking industry just as definitely as to every other industry. The fact that Smith has a family to support, and by inheritance or chance is doing it by baking, but lightly touches the interest of society in Smith the baker. Society's interest in Smith is selfish. Society hungers and Smith happens to be able to satisfy Nature's demand for food. By this fact he becomes a servant of society and earns his reward. It may consist in the support of a single family. It may be so generous as to lay at Smith's door great riches and high honors. The return will be a definite measure of Smith's service.

The success of the 30,000 units which constitute the producing end of the baking industry must depend on the ability of each of these units to render service by the production of better and more desirable food in his shop than can elsewhere be obtained.

The progress of the industry as a whole will inevitably be marked by the contribution of all of its units to the better service of mankind.

There are, then, thirty thousand reasons why the baking industry cannot advance more rapidly towards the top of the list of important food industries. And there are thirty thousand reasons why it should fairly leap to the very front.

Every coming together of bakers in city, state or group state conferences is a sifting process as natural as the weed-

ing-out methods Mother Nature has employed since the beginnings of time in eliminating the unfit and creating a finer product.

How many of all the thousands of bakers in business today will be in business ten years from now? Every baker is asking himself that question. It is always the uppermost thought in the minds of those bakers who doubt their ability to give full service and their right to demand adequate compensation for that service. Of course the answer is an easy one. The baker who has a right to success will win it. In the sifting he will stay above the meshes. These who fall through by their very dissolution contribute to the growth of the survivors. It is the old, old story which is told in every forest and every garden. The flowers which wither and the trees which fall enrich the ground from which the finer specimens get added strength.

But the human family recognizes laws which are less ruthless than these, and in the course of countless generations has evolved a system of relationship which make it possible for those units of society who are denied special privileges and opportunities, to live and grow and earn the help and assistance of their fortunate fellows. Such conventions and conferences as those which have been held in every section of the country in the past year are the protective measures by which bakers are banding themselves together for mutual help and greater individual opportunities.

The law of the survival of the fittest

*In an address at the Miami Convention of Southern Bakers Association.

and the basic observation that God helps those who help themselves are not in conflict. Rather they set out the fundamental difference between man, the human, thinking creature and those other forms of life which Nature cherishes.

How the War Helped

Time and again I have heard it said that it took a war to bring the bakers together for protection and that when easy prosperity took the place of stern necessity the industry drifted back to its old condition of self-sufficiency and complacency. It may be that there is some tendency to that reacting influence. It is but natural that the longing for the normal, the comfortable state of before the war days, should follow the rigid rules of a regulated industry and slip back into the easy, individualistic attitude which has always marked the simple craftsman. But the backward swing of the pendulum has not carried the baker nearly as far as it has many other elements of society. The lessons of war days were too well learned to be soon forgotten and the advantages of many of the regulations were too keenly appreciated to be lightly laid aside.

For out of those close-formed contacts made in 1917 and 1918 came the realization that the business of making the cereal foods is not a craft but a manufacturing industry and that industry is entitled to high appreciation by those whom it so splendidly serves.

And so it is that today we find the baking industry knit into unit organizations, which with a more definite purpose than has ever before moulded their actions, **are concentrating their efforts on a single end, the consumption of more baked goods.** Of course there are always side roads running off from the highway. Clouds obscure the clearest visions. Attention is often distracted from the major

project by little and local disturbances. But it is at length recognized by the thinking and far-seeing baker that his success and his future depend on his ability to make and send into consumption, unwise regulation, unsound criticism, become little and ineffective. For every step forward toward a larger and more stable market discounts the importance of the vexations which were met along the way.

Our Central Purpose

And now it is time we analyzed our industry and took stock of our assets. What are they worth in terms of ability to progress? How strong are we as a fighting force? What resistance can we offer against attack? What means can we best employ to extend our empire and hold secure our position as the leading food industry?

It is indeed fortunate that in the report of the census of the baking industry which has recently been published we have the first true appraisal of the work we are doing.

That report may have shocked the complacency of some bakers who had reached the impression that there were no more worlds for them to conquer. It may indeed have struck a note of discouragement in the scale of progress. But those who carefully analyze the report will find it a cause for genuine pleasure. If, as we must believe, the baking industry is now baking but one-third of the flour consumed in this country, the field still unoccupied is far greater than we thought.

It is as if a new continent had been discovered, ready to be occupied by those who have the ability to enter and serve it. **How much more than one-third of the flour we consume will be manufactured**

into food by bakers instead of by women in the home ten years from now will be determined by you who have so great an unoccupied market in the South, and by your fellow bakers everywhere who are still serving fractions of the consuming public instead of the whole number.

And whether each member of our great family eats a barrel of flour per year or a barrel and a tenth will depend on the help you give the effort to educate him to a better appreciation of the fact that of all the foods, bread is the best in nutritional value, cheapest in actual cost and most suitable for constant use, at every meal by every one seated around our common dining table.

Barrels per Year

The investigators who collected the information on which the census report was made visited or secured data from 18,739 bakeries.

Their figures classify them as follows:

Biscuit and Cracker Manufacturers	167
Bakers	18,572

Estimates which cannot be checked show some 35,000 bakers to be engaged in handling baked goods commercially. But the census figures show that the 18,572 bakeries studied produced in 1923 76.5 per cent of the total volume of baked goods manufactured.

Among the unlisted bakeries there are no doubt many plants which are doing a good business but which in some way were omitted from the census. But for all practical purposes we can assume that 20,000 bakeries are producing the baked goods of the country. And so in our efforts to build a compact, well organized, efficient industry we can safely direct our attention to the twenty thousand and hope that another census will find some of the fifteen thousand unaccounted for coming along the road.

How many of these twenty thousand bakers who are listed by Washington belong to some progressive association, some organization which has real concern for the building of the industry? We need not here include the groups who belong to labor unions or who come together solely because of personal benefits gained by cooperative buying or unified action.

We have listed at our offices the names of 95 bakers associations. In the last year we have through special letters and personal inquiries made definite contacts with 45 secretaries or presidents of these 95 associations. The membership of these associations is approximately 3,821. Sixteen of the groups are state associations, 21 are city groups and 11 are group state associations. So far as we can determine, five secretaries give their full time to the work of their associations and are presumably adequately paid for their services. Six are part time workers whose chief efforts are concerned with the holding of conferences and annual conventions. Thirty-four secretaries are chosen at annual conventions and serve as best they can without compensation other than the satisfaction they get from helpful efforts. Several secretaries should be classed as business agents for their work is chiefly given to the handling of labor matters, the employment of men and the settlement of local and minor problems of personnel and competitive conditions. This, then is the picture of the baking industry.

A group of 35,000 producers, of which 20,000 listed bakers make 75 per cent of the total output, using some 35,000,000 barrels of flour yearly and supplying 10 per cent of the total food consumed by 110,000,000 people. Behind them stand 8,000 millers, who grind 120,000,000 barrels of flour yearly, exporting 10,000,000 barrels and selling 75,000,000 to house-

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wives or other users than bakers. A group of bakery equipment manufacturers who supply the machinery used in the commercial shop, the bakery supply houses and all the diversified interests which manufacture sugars, shortenings, milks, malt syrups, etc.; the yeast companies which so closely reach the baker, and the large group who also serve the baker with paper for wrapping, transportation facilities, advertising, fuel, the long line of servants to the baker which stretches from his shop back to the wheat fields.

Various Associations

Every single link in this long chain of effort is directly and intimately concerned in placing more bread in the diet. Most of the units have a special interest in doing this through the baker. Even the miller, who in past years has been most interested in his kitchen customer, now appreciates the fact that his future market will be the bake shop.

So instead of thinking of our industry in terms of the man who makes and sells the final product, we should expand our boundaries and count as components all of these other servants of mankind, these partners of the baker in the production of bread.

And as has long been the case in other industries, these allied trades are more compactly organized, more alert, closer in touch with most of his economic problems, than the baker himself. If in past years the men of the Allied Trades have too often been salesmen to the baker instead of partners in the service of bread consumers, that condition fortunately does not hold so true today. We can then count every active, aggressive member of the Allied Trades group an efficient member of the organization which must be perfected if we are to dignify and develop the baking industry and so increase the measure of its public service.

Our effective forces then are today about as follows:

One national association of some 700 members, operating over 3,000 ovens.

One national association of some 4,500 retail bakers.

Four group state, 16 state and 21 city organizations; some fifty other bakers' organizations which do not function at all or so casually as to be of little value to the industry as a whole.

An active association of bakery equipment manufacturers, well officered and financed; a large group of allied tradesmen, still a bit in doubt as to just how they can best serve, but worthy to be counted as active workers; a compact group of bakery supply houses; a national association of millers, purposeful, progressive, efficient, serving its membership and through its units the bakers it supplies with flour and every consumer of bread.

To this group of organized, officered, equipped workers should be added the powerful forces of the yeast companies, who far more than the baker himself have worked for his advancement; of the great milling companies, who carry the baker's message through national advertising to millions of homes, and of all the agencies who in the development of their own business have stressed the value of bread as the basic food.

Our Potential Power

This group of diversified interests looks powerful. It is powerful—potentially. Each unit, in building for its own advancement, contributes something to the common cause of increased consumption. But it has never yet worked for one definite end. Some of the units supported the work of the Wheat Council when two years ago a campaign to "Eat More Wheat" was projected for the relief of the farmer and the help of the baker working for increased consumption.

Definite progress was made in the Toast campaign. The contacts developed through this work are still strong; the

results in many cities where the campaign was efficiently handled, as in Pittsburgh, were definite and enduring.

The drives for coordinated advertising through which all manufacturers of foods which enter into consumption with bread seek to utilize the appetite appeal in stimulating increased consumption of bread and meat, bread and butter, bread and milk, bread and jam, bread and cheese, have been most successful. In the past year the baking industry in all of its branches has seen many millions of dollars worth of bread advertising posted on the bill boards, shown in the car signs, printed in papers and magazines, displayed in the groceries, which did not cost baker, miller or supply man a penny. And this form of advertising of bread—perhaps the most effective form yet devised—will continue to stimulate increased bread consumption.

Coordinated Advertising

At American Institute of Baking we have made really remarkable progress with some of our efforts. There is no longer any doubt as to the place the baking industry holds in the scientific world; it is recognized everywhere as the most important food industry. Its success in organizing its efforts in education, in research, in science, through the Institute, places it above all other industries in far-sightedness and constructive ability. And at length, after years of fruitless protestation, after generations of millers and of bakers have labored to break down the opposition to white bread, through the work of the Nutrition Department of the Institute, as yet hardly three years old, the leaders of nutritional thought are now accepting our statements and agreeing with our belief that the modern loaf of bread is the best balanced food, the basic food, the most desirable food for all members of the human family.

At the Trade Promotion Conference held at the Institute in February, more than 100 of the most active sales-managers of the baking industry spent two days discussing their problems of getting bread into consumption. The census reports, coming in the first day of the Conference and showing that the baking industry was not using 60,000,000 barrels of flour annually, but probably 35,000,000, did not discourage the Conference. It stimulated it. It set a new and larger goal to be won. Out of the discussions came the conviction that the individual baker could never hope to win a larger market except by taking business away from some competitor, unless he educated his customers to a greater appreciation of the value of bread in the diet. And the belief that the chief obstruction in the path of progress was inferior quality of bakers' goods was badly disturbed by the definite data on the work of the National Dairy Council, the great organization of the dairy interests. Their figures showed that while creamery butter has long been recognized as a product of finest quality, and while market milk has for many years been of superior quality, these facts did not increase their consumption. But when every unit of the great industry, retail milk dealers, butter and cheese dealers and manufacturers, and all their collateral and allied trades groups, entered the campaign organized by the National Council, raised the money, enlisted the bankers, and under centralized leadership started toward the goal of increased consumption of dairy products, they produced definite results.

In 1921 the consumption of butter began to climb back to pre-war levels, and in 1924 it reached the average consumption of 17.1 lbs. per capita. In 1917 the average consumption of milk was 42.4 lbs. per capita; 1923, 53 lbs.—a definite gain of 29.0%; and in Philadelphia when

an intensified educational campaign was made, the increase in milk consumption was over 50 per cent. And those increases were not spasmodic—they were permanent. People are using more butter and milk because they know they should.

How Butter Men Worked

This increased consumption was not due to better products. It came when the consumer was taught why he should eat more butter and drink more milk, and how he could introduce larger quantities into his diet. And the trade promotion conference saw that exactly the same problem had to be worked out by the baking industry. Quality is a most vital need. Perhaps poor bread, poor cake, poor pie is the largest single deterrant factor to increased consumption. But **quality** is not the predominant need. Quality is essential to increased consumption. But improved quality will not alone increase consumption. And one definite program for increased consumption was offered the conference—tentatively, it is true, but those who heard Alex. Osborne's plan for putting a fourth meal in the American dietary were thrilled by its potentiality. The idea is not new. We have often pointed out its possibilities and hoped some definite plan might be worked out for its accomplishment.

Definite Projects

Here then is a definite project. Let us line it up alongside of other plans we are developing:

1. The fourth meal.
2. Make toast your breakfast food.
3. The sandwich shop lunch service.
4. Bread, the "carrier" food.
5. Bread, the milk bottle of the race.
6. Cake, the sweet for children.
7. Pie with every meal.

This is a short list, but every one of the projects, if successfully carried out,

will open for the baker and his allies new markets and bring definite increase in business.

Mr. Osborn has offered a tentative plan for carrying "the fourth meal" campaign. It is a good plan. It will be productive. But he cannot execute it. Generals do not win battles. The men in the trenches, the common soldiers, backed by organization behind the lines, win battles.

How can you, a baker in Florida, or Georgia, or Tennessee, put a fourth meal into the dietary? How can you convince the children of your town and their mothers that they should eat less candy and more cake? How can you secure the cooperation of the packing industry in advertising the virtues of bread and meat, or of the butter and cheese merchants in stimulating the eating of more bread and butter and bread and cheese sandwiches? How can you increase the sale of toasters, that your bread may be made the breakfast food instead of corn meal mush?

A Tentative Plan

May I tell you how you can do these things? May I present for your consideration a plan of organization which will function in your interests and which will increase the consumption of your products? This is the plan—it is tentative today, but it is the process of development, and with your assistance we hope to present it in a workable form when the baking industry gathers at the International Exposition at Buffalo in September.

The campaign will be carried out by bakers and their allies working as units in their home towns. It will not be done for them by the milling industry, by the yeast manufacturers, or by American Bakers Association. The organization will be built from the bottom up, not

from the top down. The campaign will be organized and its development directed from a single headquarters. But every unit will preserve its freedom of action, tho' synchronizing and harmonizing its work to the general plan.

A few years ago we hoped we were working for the whole industry when American Bakers Association set up its high standards of sanitation, subscribed to a code of ethics and developed a plan of certification for membership plants. The theory was sound and the objectives were desirable, but the plan proved impracticable. It was built wrong side up. It created a great organization at the top but failed to reach down to the baker in his one oven shop. It was all general staff and no private soldiers.

Education the Slogan

The ideals then set up still obtain. The vision of the men who drafted the plan is undimmed. And they will see the fruition of their hopes for a great industry for service. But just as our national organization will grow and render maximum service, only as its unit parts, the city and state organizations, grow strong and prosper, so these fundamental movements will develop only as they interest and enlist the support of the individual baker.

And so today American Bakers Association sees its work ahead as that of educating both baker and consumer to a finer appreciation of the high value of the service of those who make our most essential food; as the elevation of the baking craft into its deserved position as the most important food industry; as the educator of the physician and dentist to a full appreciation of the modern loaf of baker's bread; as the leader in the movements which will stabilize the industry and secure for it broader and permanent markets.

Its work is based on the laws of sound economics. It offers no panaceas to distressed members. It will never resist the development of movements which will benefit people, for it knows that in the long run those conditions which best serve mankind will also best serve our industry. The one purpose of American Bakers Association and of the Institute is to serve as best it may in the work of building a better, more virile race, through the production of its fundamental food.

Our Bread Story

THE story of bread's place among the multitudes of food was shown in exhibit form at the All Community Health Pageant, at Chicago, March 13 and 14. Prof. Roscoe H. Shaw, in charge of nutritional feeding experiments at the American Institute, set up a series of cages showing test animals in all phases of growth and development. White albino rats were used. The failures of the species were two mouse-sized rats who had only received water-mixed bread. The super-sized animals at the other end of the story were two over-developed albinos who had received bread mixed with whole milk and in addition all the milk they could drink.

The exhibit showed that the animals grew in size in direct responsiveness to the diet. Bread mixed half with water and half with milk produced animals capable of slight growth only while normal-sized animals were the result of a diet of whole milk bread. Liquid milk in addition to the whole-milk bread produced the super-sized families. Prof. Shaw was kept busy during the exhibit explaining to interested visitors how the baking industry was using this data to build up modern bread as "health insurance" for city children who are likely to eat too small a variety of foods to be completely fed.

Telling Milk's Story

THE Evaporated Milk Association is one of many associations that now realize they have a story to tell and ought to be about the task of telling it. The drives to acquaint the people as a whole with the story of what their industries mean to them are likely to be the next great, outstanding development of the industrial world. The baking industry is considering many plans that will be submitted at Buffalo. In the meantime, here is what the Evaporated Milk Association is doing, as we learn from Agnes Olson, of the association's educational department:

There are 2,200 teachers, in thirty different states, who have been furnished educational material by the Evaporated Milk Association. This material is used not only in Home Economics classes, but in civics, physiology, agriculture and geography classes as well.

The Association is developing this educational work further. As a step toward a broader program, two projects have been undertaken at the University of Chicago. Under the direction of Doctor Katherine Blunt, head of the Department of Home Economics, recipes are being tested to develop those which give most satisfactory uses of evaporated milk in all types of cooking. To advance the nutritive field for evaporated milk, a study in mineral retention is being made upon children and grownups. In the Department of Physiological Chemistry, under the direction of Dr. E. O. Jordan, a fellowship has been established to study the effect of the process of preparing evaporated milk on the vitamin content of the finished product.

Specially prepared charts illustrate the scientific production of evaporated milk. Indirectly they show why evaporated milk is available and generally used in every

town and city, from the smallest to the largest.

By preparing material for use in schools, the teachers are provided with aids to make their teaching live and practical. Acquainting future home-makers and providers with interesting and up-to-date facts about an industry whose production in 1924 was valued at \$135,000,000, is the correct method of telling the true story of this wholesome product.

Handling Men

As an aid to handling my men, I always like to know about their home conditions—whether they are married, whether they are buying homes, if they have children, and what their hobbies are. If an employee has a hobby I know about I ask him the latest news. Good will counts for so much more in discipline than harshness. I have seen employees go to pieces and on making friendly inquiries have found conditions at home that have upset them. If there is sickness I head a paper among the boys to pull things through. If the man is merely tired out and run down I tell him to take a little time off with pay. After all there is a heap more in business than dollars and cents. You stand by your men in a pinch and most of them will stand by you in an emergency. I have found it working out as a rule that the composite loyalty of an organization's men is in exact proportion to the degree of sympathy and help extended to employees in time of trouble.

—"The Old Boss," in the *Grocers Bulletin*.

You are certainly performing a great public service in studying ways and means to improve such an important food as bread.

—Eugene L. Fisk, *Life Extension Institute*.

Hearts, Hands and Machines

*Not without Its Cost in Heartburnings has the Machine Era
Effaced Hand Work in Baking*

DOES anybody but a poet and a baker know that men could get as fine a thrill out of moulding a splendid loaf of bread by hand, and passing that loaf out over the counter to an eager customer, as a poet could get out of finely shaping English words?

There are bakers of that kind. Many of them. In Montreal, when the first mixing machine was installed, a baker quit the employment of Dent Harrison. He said he couldn't bear to see a machine kneading the dough. That had been his task all his life. He had come to love the feel of it.

Later that baker came back. He wanted a job. He was growing older, and lifting the heavy batches of bread was wearing him out. He was willing to surrender to the machines now.

In Butte, Montana, again, the writer was driving up a hill in company with Jacob Osenberg, the largest baker of Butte. An old man passed and waved his hand. Osenberg explained. The old man was the first baker of Butte. But he had come to love the feel of the dough and when his friends urged him to surrender to the machine era he replied, "No, I can't—I'd be lonesome without the dough between my fingers." That old man worked on until illness overtook him. In the meantime mixing machines captured the industry and men would not look at a job that called for hand mixing.

The baker's trade ebbed away and he was left to a disconsolate old age.

This thing has been observed in other so-called humble trades. We once knew a butcher who was reviled because he charged 35 cents a pound for ham, where-

as another butcher across the street charged only 18 cents.

He told his questioner to go on and trade over there—he didn't want a quarrelsome trade. Then he defended his charges. He said he could not put a knife into ill-grained and ill-conditioned meat. He suggested that if his visitor would go across the street he would find the ham oozing with oil. That meant it had been fed on peanuts, or kitchen leavings. He pointed out the difference in the ham he loved to cut—firm of grain and solid in body. That, he explained, meant that the ham had been corn-fed and raised as prime meat for a discriminating market. We found another statement of his was absolutely true, although it seemed impossible to believe it. Every morning he got up at 3 o'clock and went to the wholesale market—just to choose the finest meat of the day. He could never be induced to take a full grown animal. He wanted only the tenderest of the corn-fed youngsters.

And he had his way in the wholesale market and radiated joy as he worked with saw and cleaver in his shop. He loved to think his customers knew of things as he did. And he wrapped a little bit of pride and esteem in his craft with every package of his meat. Ask him about the difference between Canada mutton and real mutton and he would turn loose into pæans of praise for the one and phillipics of denunciation for the other. Canada mutton he knew to be "old goat"—the Billie of New York's shanty days. And he could neither cut nor vend it. Poet he was—working out his spirit

in the terms of carved meat instead of written words.

And all of this is written as a preface and to make a background. A baker who loved to bake with his hands while he thought with his head has just left off his baking and has deserted his bench.

Everybody knows him. He is the poet and philosopher and father confessor of the industry, and the friend of man. Bakers who remember the great Wheat Conference banquet of June, 1922, recall that at this conference the President of a great railroad spoke—and received some applause. The president of the world's greatest harvester company spoke—and was well received—but that a "little one-oven baker" got up and—stormed the house. He was cheered by people who rose to do it.

And how did John Hartley get that way? This man who knows the literature of England and loves the most loving passages of Robert Burns, loved also the dough batch—and loved to have his hands in it. Along came a ruthless age. An age of rising prices, rising taxes, rising rents.

Somebody saw his little bakery and coveted it as a site for something else. So John Hartley was "leased out." The new tenant raised the rent several hundred per cent. Modern competitive conditions had brought in another situation. A chain store nearby would announce a "bread leader" without warning—3 or 5 cent loaves in a 10 cent market. That would mean for John forty or fifty unsold loaves on such a day. And that, in turn, would mean goodbye to a day's or a week's profits.

So John Hartley deserted his bench and his oven and became a scribe for all of his time. The little shop he ran was the gathering place beside the baker's road of life where things were figured out.

Saturday nights around the little wood stove into which John piled the scrapped boxes of the day, were nights of treats to the biggest and the best of bakers. They were nights punctuated by little trips to the counter—as John would find it necessary to pass out one of his dwindling stock of loaves to a customer.

Came a night when the landlord brought an end to all this. And on that night John Hartley mused. As only a poet could muse and wonder—about bread and life.

"Do you know," he confided to the old typewriter that had turned out many of his thoughts about life, "do you know, there seems to be no substitute for the peculiar satisfaction that comes from the work of the hands.

"I found it especially so when the task reached from the first start to the final conclusion. That flock of bread over there on the table, I made it—it's mine in the most intimate sense. When somebody says 'it's good' that means something. When people come back continually to buy, they become in a sense your own people. Their very coming proves all that they have said and much that was left unsaid. Yes, there is a peculiar satisfaction and a building up of a certain self respect in craft work. And it is so very direct in its action. The true artist must wait. At times appreciation from without never comes to him through his life. With us we collect it in every sense day by day. To one not used to it or who has not partaken of it, it may seem a poor sort of satisfaction. But it exists. The poet Whittier knew it, and Friar Tuck glimpsed it in his verse, 'Weary was Jesus for the smell of wood.' Friar Tuck knew the call of the carpenter's tools to the carpenter. 'Weary was Jesus for the smell of wood. Sweet smelling shavings curling from the plane. When ringed with venge-

ful Pharisees he stood, then that old shop seemed good.' "

John Hartley felt that way when giving up the old shop. Baker's Weekly had seen to it that he lost nothing—in money. Always generous with writers and thinkers within the craft, it had gathered him in for a more continuous writing role.

But John could not step up to the new day with a whole heart free from loneliness. "I have used myself to writing to Editor Klopfer regularly after the crowd had gone and the night's work was over. Somehow I feel the need of the daily task with the dough. My feet were firmly fixed on the ground here. They and the rest of me were always a bit tired, but I believe that is the natural way for a baker to be. Possibly now I'll have more leisure, but I have not been trained to use leisure. I do not like to close this chapter of my life. I am wondering a lot of things. I was wondering about it last night. When will I now have time to do a little quiet thinking, if my daily task is pulled from under me? This old joint of mine proved a real refuge for thinking. It always seemed like I could get at a proposition better when otherwise employed—when my hands were busy with the dough—if you can get the paradox."

It is not hard to get the paradox of John Hartley. When big and little bakers got to rowing, he was the man both came to, to talk it over and iron the wrinkles out. Many a man has had to face as he has a change in mid-life. Few careers, indeed, will last a whole life through in this rapidly changing world. But John Hartley can never be anything but an asset to his industry. He is one of its chosen spirits, whatever and however he may work as days go on.

—I. K. R.

Condemned Methods

In competition the Federal Trade Commission has listed certain methods as unfair and unfit for use. It has tagged them with its "condemned card." Among those thus classified are bribery of buyers for customers, making unduly large contributions of money to associations of customers, using espionage to obtain a rival's trade secrets, enticing away employees of competitors, using false or misleading advertisements, and making false statements against a competitor's product, credit, or business standing.

We have received the Institute's letter telling us that Mr. Berg, of your Service Department, has scored two of our loaves 96 and 97 per cent. Will you kindly advise us what the highest score so far is, along with any suggestions you may have for the improvement of our bread? We do not want to stop until we have received the highest grade obtainable for our Butter-Nut bread.

—V. F. Miller, Miller-Parrott Baking Co.,
Terre Haute, Indiana.

Friendly Aid

I have recently assumed charge of the publicity bureau of the Buffalo Chamber of Commerce and would be glad to cooperate with you in any way possible in obtaining publicity for the convention and to do anything else that may be of service to the baking industry.

—P. D. Fahnestock, Buffalo, N. Y.

I owe it to your Institute to say that I am getting more and more interested in its affairs, and in bread baking, and that I am beginning to take what I read in Baking Technology without any salt.

—William Brady, author of a newspaper syndicate series on Health and Nutrition.

Women in Trade Promotion

How They May Ascertain More Accurately than Men the Housewife's Reaction to Baker's Products after the Sale for Home Use

By AGNES WHITE

What role have women to fill in modern baking? Obviously it is not in baked goods production, for Mr. Steinmetz and Mr. Edison and such inventors as Roberts, the oven man, brought an end to all muscle work. Out on the home circuit, finding out what Mrs. Housewife really thinks of the baked goods she buys, Miss Agnes White of the Washburn-Crosby Company found useful work. She made known her conclusions about it at a talk at the Institute. It is given here so that any baker, having a problem of home inquiries to solve, may see how one organizer of such a movement worked out her ideas.

A WAY back in the days when good little girls prayed to the Lord to keep them pure—just as pure as Royal Baking Powder—it wasn't necessary for bakers or millers to send inquiring folk, either male or female, to the homes to find out how Mrs. Jones or Mrs. Brown liked their baked products.

The greatest salesmen in those days were Mrs. Brown and Mrs. Jones and their neighbors. These good ladies told the sewing circle what fine cake they got with So-and-So's flour and what fine biscuits were raised with Such-and-Such baking powder or yeast. Hence the fame of an accepted product was spread, and the consumer demand was created by the consumers themselves.

Great cities spoiled all this neighborliness and gossip as a reliable sales force. Mrs. Brown reached a point in her social development when she washed her hands of domestic duties and laid off her kitchen apron and started for the movies. After that she might brag to her neighbor on how clean she kept the windshield of her new Super Six, and she might be an expert on vamps and Valentinos, but she had let the makings of her daily meals pass more completely out of her mind and

more completely into the control of her grocer or chain store.

It is into this new era that the manufacturer has to move with personal contact work. And shall he use a man or a woman? Being a woman myself, I feel it is no bit of braggery to state that a woman can appreciate a woman's reaction to a food product more completely than a man can.

Baker's Best Method

What is the baker's best method to try in personal contact work? He must himself furnish the first essential for the work—a quality product that the contact worker can always be glad to explain and know she is telling the whole truth when she explains its superior points. Next the personality of the contact worker counts. She must have a pleasing personality to tell an effective story. If the baker has a quality product as his contact worker has not a quality personality, then by hiring her he is indulging in a very expensive form of advertising. And he may leave an unpleasant rather than a pleasant reaction on the consumer's part. Thus both quality product and quality contact workers become essential to any campaign.

Books for the Baking Laboratory

MARKET ANALYSIS. By Percival White, A. M. McGraw-Hill Book Co., 1921; 340 pages, 52 graphs and figures.

"Altho addressed primarily to business executives, it is hoped that the book also will prove of value to the professional market surveyor, as well as to the student who believes that, in the coming business era, scientific methods will be applied to distribution as they were to production in the past era.

"Markets are measurable. If we were in possession of all the data, it is safe to say that markets would be as measurable, as certain, and as determinable as any other phenomenon which obeys fixed laws. Markets are real, tangible, definite things.

"It seems indisputable that the markets of the future are to be won only through the application of the same scientific methods which were so successful in the field of production. It is probable that markets may be sought so eagerly, as a result of this competition, that they will be available only to those who apply scientific methods most intensively."

Having expressed those opinions the author has proceeded to divide the business of market analyzing into its component parts and then to treat each part as definitely as tho it were a problem of scientific analysis. The broad field of industrial markets to be covered necessarily includes many phases of marketing with which the baker is not immediately concerned. But the principles involved in any marketing study are definite and fixed, and the active-minded reader cannot help but be stimulated by the association of these ideas in terms of his own industry. Many of the chapters do apply most decidedly to the investigation of markets for baked goods.

Under "Methods of Securing Data" the three main procedures for obtaining accurate information are discussed at length, with the aid of examples. The advantages and disadvantages of direct interviews are of especial interest.

The company involved, its competitors in the same field and in other industries, and the industry itself all come in for their share of analytical treatment in their relation to the market to be reached. The attitude of the company's customers is analyzed and their principal motives for purchase are considered, along with their general characteristics as ultimate consumers.

The author says in conclusion: "The executive cannot help finding that market analysis work is

distinctly constructive. Even the most cursory survey will prove informative."

In view of the recent apparent lack of accurate information about markets in the baking industry, this book should serve as a mental stimulant to those bakers who consider market studies as beyond their means, as well as to those who are satisfied with their own opinions of their marketing ability.

L. A. Rumsey.

Abstracts of Technical Articles

Selected for Baking Technology from Chemical Abstracts

The choice of a suitable shortening for the baking industry. L. W. Bosart. *Am. Food Jour.* 19, 481-3 (1924).—A proper shortening "should be sweet, digestible, neither too hard nor too soft; it should have good shortening power and should not contain a large amount of oxidizable oil." Rancidity is due to (1) hydrolysis caused by bacteria and to (2) oxidation; the latter is considered. Bosart then discusses cottonseed oil for edible purposes and the development of fat hydrogenation; also the suitability of lard, lard compounds, olive oil, cottonseed oil, and "all-hydrogenated fat" for shortening.

J. A. Kennedy.

Effect of water containing free chlorine in bread.

C. B. Morison. *Cereal Chemistry*, 1, 267-71 (1924).—Baking tests indicate that the presence of free Cl in H_2O to the extent of 5 to 10 parts per million does not appear to have a deleterious effect on bread quality. The use of 5 parts per million of Cl in H_2O used for the determination of the fermentation power of fresh yeast by the Hayduck and Meissl methods did not appear to decrease the rate or total volume of gas evolved in comparison with tests made at the same time and under the same conditions in which no free Cl gas was present.

R. B.

Some critical considerations of the gluten-washing problem.

D. B. Dill and C. L. Alsberg. *Cereal Chemistry*, 1, 222-40 (1924).—Results of experiments with distilled water, tap water, 0.1% NaCl solution, Na_2HPO_4 , of varying concentration and 0.1% $CaCl_2$ solution are given.

Gluten washed with tap water was of better quality than gluten washed with distilled water. Considerable variations in concentration of a Na_2HPO_4 solution (pH 7.6) did not greatly influence quality or yield. Glutens from different flours with a 0.1% neutral CaCl_2 solution, were of poor quality, high water content, and low protein content. Gluten washing with Na_2HPO_4 buffer solution of various H-ion concentrations demonstrated that there is a minute protein dispersion near neutrality. Gluten washing with approximately neutral 0.1% Na_2HPO_4 solution, 0.1% CaCl_2 solution, and tap water proved that Na_2HPO_4 solution was most effective in preventing gluten dispersion. The importance of adopting Na_2HPO_4 as a standard wash water is pointed out and a modified method is suggested.

Ruth Buchanan.

Bread. G. S. Titus and F. M. Grout. U. S. 1,502,888, July 29, 1924. In bread-making, 50-90% of the total amount of flour to be used is mixed with 50-90% of the total H_2O together with 0.1-2.0% of a composition or mixture containing salts having yeast-stimulating properties (e. g., "Arkady"). After these substances are thoroughly mixed, the mixture is allowed to stand for 1-5 hours and is then mixed with the remainder of the flour and H_2O to be used and with yeast and the other ingredients of the dough batch, allowed to stand for a suitable time, and then scaled, molded, proofed and baked. The purpose of the preliminary treatment is to "mature, mellow and toughen the gluten present in the flour" and to effect a bleaching action upon the dough mass.

"Breakfast food" enriched with vitamins. Kellogg Co. Brit. 217,282, March 5, 1923. Bran is soaked in H_2O at a temperature of about 18-20 degrees to extract vitamins. The soaked bran is mixed with dough and bread is made in the usual manner from the dough and is then preferably sliced or crumbled and toasted and the vitamin extract is added to it. The material is then dried at a temperature not exceeding about 70 degrees. Vitamins from milk, yeast or other sources also may be used.

Bread. L. E. Buffington. U. S. 1,500,545, July 8, 1924. A "no-fermentation period dough" or "no-time dough" for bread-making (with which the entire bread-making operation from start to finish may be completed within 100-110 minutes) is formed from lactic acid $\frac{1}{2}$ oz.,

NH_4 phosphate $1\frac{1}{4}$ oz., H_2PO_4 $\frac{1}{2}$ oz. and pepsin $\frac{1}{4}$ oz. incorporated with H_2O 110-120 lbs., salt 3 lbs., sugar 6 lbs., lard 3 lbs., yeast 5 lbs. for each bbl. of flour with or without the addition of malt and milk.

The quality of gluten of flour-mill streams as determined by the viscosity of water suspensions. Julius Hendel and C. H. Bailey. Cereal Chem. 1, 320-4 (1924).—Flour mill streams vary substantially in gluten quality when the latter is determined by the viscosity of washed and acidulated water suspensions of the flour. Middling flours rated the highest and break flours the lowest in gluten quality. The latter contained the highest percentage of gluten, however, which tended to compensate for the inferior quality of gluten.

Ruth Buchanan.

Calculation of absorption to any moisture basis.

Edward Gookins. Cereal Chem. 1, 305-8 (1924).—The calculation by a definite formula of the absorption of moisture by flour is tedious; the graph offers a ready and convenient solution. A graph is given with directions for use.

Ruth Buchanan.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

of BAKING TECHNOLOGY, published monthly at Chicago, Ill., for April, 1925.

State of Illinois, } ss.
County of Cook, }

Before me, a Notary Public in and for the State and County aforesaid, personally appeared I. K. Russell, who, having been duly sworn according to law, deposes and says that he is Editor of BAKING TECHNOLOGY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation) etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, American Institute of Baking, 1135 Fullerton Ave., Chicago, Ill.

Editor, I. K. Russell, 1135 Fullerton Ave., Chicago, Ill.

2. That the owners are:

American Institute of Baking, a Corporation formed not for profit,

H. E. Barnard, Manager,

Louis F. Bolser, President, acting for American Bakers Association.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

None.

I. K. RUSSELL.

Sworn to and subscribed before me this 26th day of March, 1925.

Rosabelle E. Priddat.

Notary Public.

(Seal)

(My commission expires August 24, 1926.)

Home-made Bread and Baker's

UNTIL recently many flour mills advertised and pushed the sales of flour to the housewife, and furnished her many little books of recipes for making home-made bread. One woman who baked for herself had a flattering husband, and he flattered her into the notion that her bread was the best that any woman could bake. She confided to the grocer who sold her her flour, what a wonderful bread baker her husband conceded her to be.

The grocer confided the glad news to the flour salesman and he asked for a loaf of her bread. In turn he sent it to the Institute to be scored. He did not state that it was a home-made loaf, or what was wanted. Actually, the desire was to get a score so high that the flour salesman could use it as a talking point for his flour.

But the loaf was scored—and the score was so low it was hardly worth recording. The loaf told its own life-story. It had been left to stand too long as dough—far too long—for it was greatly over-fermented. It was sour tasting and sourish in odor. After being left to stand far too long it was baked far too little. And as if overfermenting and underbaking were not crimes enough against a household loaf, it had been made with potato starter.

Now, every cheese-maker knows that the air is full of "wild yeasts" and that when they got into his cheese they brought "wild flavors," since all flavors that mankind loves best, and some he loves least, are the product of yeast and bacterial action. The cheese-maker fought to conquer wild yeasts by methods of sterilization that killed all so he could start over with the kind he liked best. Just so the bread-maker in the bakery long ago did

away with potato starter to get a pure culture yeast uncontaminated by wild flavors from the air. The crust of the housewife's loaf was pale, its grain was large and open, showing the characteristic evils of an over-proofed loaf, and the flavor was as evil as well could be.

Obviously the woman had a diplomatic husband who "knew his oil," if not his bread. Some of the flour the housewife had used was handed, with some first-class, refrigerated yeast, to a young woman of the Service Laboratory staff. She was told to bake a few loaves by hand using the household method—plus what she had learned at the Institute. The young lady hand-mixed a batch of four loaves, but during fermentation she used a thermometer and she took the dough just at the right time instead of allowing it to age and be over-proofed. She obtained a loaf of bread that showed the flour to be excellent—provided only it was baked without crushing punishments in the process of fermentation and proofing.

The Institute loaf and the home-made loaf were sent back to the flour mill. For answer came an immediate letter. After all, the miller opined, the ordinary family would be much better fed if it left the science of baking bread to the scientists of the industry, and did not try to go ahead further with old craft ways. He decided that he would join the chorus of those seeking to advertise baker's bread to increase its sales rather than to try to go further with household hopes.

Mr. Berg, of the Service Laboratory, has suggested that some baker could have a real get-acquainted party in his town if he asked some ladies' club to bring home-made bread to his bakery to be cut up by the women themselves and scored.

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Summoned to Service

THIS is a frank statement of the situation which has been developed by American Institute of Baking for the benefit of every baker and an equally frank appeal to him to come out of his shop and work with the Institute in setting higher nutritional ideals for the American people. The miller has been a manufacturer of flour, the baker has manufactured bread. Both miller and baker have been satisfied

to meet the public's demand for his product. Neither has appreciated the opportunity he has for stimulating an increased consumption of his product. This however is a general statement which does

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not fit the facts as we apply them to many progressive millers and bakers but it is unfortunately true of the majority.

The Wheat Council was organized and supported by the joint efforts of a few although the benefits of its work became the common property of every person connected with the transmutation of wheat into food. The stimulus given the movement for increased wheat

consumption by the work of the Wheat Council was far more important than the immediate and direct results accomplished, and now, although that work has been long closed, the generous efforts

of those who then supported it continue to permeate the industries.

It is evident that the American people who by the stimulus of the Council were led to study the complex economic aspects involving the raising of wheat and its baking into bread, got visions of the work of the grain grower, of the miller and of the baker which more clearly than ever before established the tremendous importance of their efforts for the common good. This must be the case for everywhere we find a more generous appreciation of the work of these three great fundamental agencies which are engaged in preparing our most important food. The farmer sees the miller and the baker as his partners in getting his wheat into consumption. The miller realizes that the grist from his rolls has no value until it is prepared in the bakery in edible form, and the baker has learned to look upon the miller who furnishes him his flour and the other industries which contribute material and machinery for his formulas and his aid, as an essential part of his own work as a baker.

The role of bread in nutrition is more fully appreciated than in past years. Its importance as the basic food around which all other foods pass into consumption is better understood, both by consumers and by those who stand behind the high chair of the children with advice as to their nutritional needs. The technical knowledge of the physician and the specialist is no longer so closely held. It is being passed on to the mother in the home and to the child in the school through the family doctor, through dentists, nurses, teachers and children themselves who year by year are being taught in their schools the facts of daily life.

Dairy Industry Organizes

The dairy industry has cooperated with all of these agencies for the spreading of

nutritional information and greatly enlarged the market for its products. No campaign of national advertising, no effort of individual dairy men, or butter or cheese manufacturers could have accomplished even a fraction of the permanent results which have come through the setting up of partnership effort between milk producers and distributors and all of the agencies which are interested in better nourished children. This machinery for using these agencies has been built. To many of us it seems as if it were built to our order for it so perfectly fits into our need for a means for increasing the consumption of bakery products, and yet there has been no unified effort to set the machinery in motion.

The baker still fails to recognize his local health officer as a co-partner, as an efficient aid to his sales manager in developing increased consumption. He is still fearful of the criticism of the doctor and dentist whom in years past he has with sinking heart heard criticise the food value of his product and advocate the consumption of other foods than bread. He is even afraid of his editor because under the usual practice of considering all statements, no matter how erroneous, to be news fit for printing he gives first page space to food faddists, and reports the wildest tales handed out for consumption at business men's luncheons with all the seriousness given a review of the address of a sound scientist.

It is time for all these fears to be forgotten. Bakers are no longer children walking in the woods, or fearful of the dark. The paths of science lead them out of the maze of nutritional falsities. And there is no longer any mystery about bread nor any reason why the baker should hesitate before claiming for his product a superiority above all other foods.

Baking Technology's Past

During the past two years Baking Technology has published scores of reports on the subject of the role of bread in nutrition. These reports have been based on sound scientific evidence. They have been prepared in our own laboratories and garnered from the scientific literature of the world. They have established beyond fear of contradiction the true value of bread in the diet of the child and of the adult. They have broken down the old ideas that white bread was a deficient and so undesirable food, and have pointed out that no dietary, if limited in variety, can be complete. These reports have emphasized the necessity for building the diet of the child and of the adult around bread as the basic material; of using it, well supplied as it is in energy material, in carbohydrates, in protein, in fats, as a means by which to introduce into the diet butter with its wealth of growth promoting vitamins, milk rich in the salts of lime and essential proteins, meats with their valuable proteins and mineral constituents, and the other food ingredients and accessories which, generously provided, insure our children against any deficiencies in their diet and furnish cheaply, wholesomely and adequately, the substantial foundations on which a stronger childhood is being built. That is the position of the baker before those whom he would serve.

Demand Recognition

Is it not high time for him to demand the recognition to which he is entitled as the provider of our basic food? How can he longer remain silent under criticism, criticism that he profiteers when he is asking only a reasonable return for his labor and investment, criticism that his product is inferior in quality, that his manufacturing methods are inadequate and unsanitary, criticism that his materials are carelessly chosen and unintelligently blended

and handled, and criticism that his product lacks the essentials of proper nutrition and so is an unfit food? How can he step forward effectively to meet these issues? As we see it, his path is now clear and it has become his duty to assert his right to a full appreciation of the importance of his work.

The Trade Promotion Department of the Institute is the medium by which the work of its research departments may be made valuable for the baker and through him passed on to every consumer. It is the hope of this department of the Institute, through the utilization of contacts with the medical profession and with the leaders in the dental world, to stop the attacks on bakers' products. In a national way this is being done with the cooperation of the national association of physicians and of dentists. Syndicate writers on the general subject of nutrition are lending their aid to the distribution of real facts instead of false and antiquated ideas.

National magazines, especially those of interests to the world of women readers, are committed to the larger use of modern breads. The industries whose products go into consumption with bread are putting all the forces of their national advertising behind the development of a larger business for the baker because they realize that every additional slice of bread consumed carries more butter, more cheese, more meat into consumption.

It is a Local Problem

But all these outside influences will not quickly solve the local problems of the individual baker for the doctor or dentist or nurse, who, twenty years ago was taught certain ideas about nutrition and will not soon abandon them, nor quickly gain the newer knowledge, even though it be printed for him in his technical journals. What he must have, if he is to get a new vision

in which he will see the baker and his products in a new relation to nutrition, is the help of the people in his home town in casting off old notions and taking on and applying new facts.

In an effort to operate the machinery by which this information can be passed on in every community, bakers' clubs are springing up throughout the country. These clubs are not organized primarily for the purpose of bringing bakers together to talk about shop problems, labor troubles, flour prices, unfair competition, or hard times. Discussions of these subjects are helpful. They bring bakers closely together and break down foolish fears of competitors, but unless the purpose of these meetings is broadened so that through them contacts are made with the world beyond the bakery door their chief function will atrophy and the opportunity of using them as a means by which to carry the story of the baking industry into the home will have gone. If a year from now in every community where two or three bakers get together, a bakers' club is functioning under the auspices of which at frequent intervals at luncheon or dinner the baking industry gather together with its friends among doctors and dentists, among teachers and nurses, among leaders in women's work and in civic effort, it will be possible to carry to millions the story of undernourished childhood and of baker's bread as the best remedy for malnutrition and the chief food for every family.

Baker's Clubs the Wheel

The baker's club should be considered as the hub from which radiate the spokes representing the baker, the flour salesman, the yeast salesman, the advertising man, the milk butter and cheese industries, the meat dealers, the grocers who pass baker's bread into consumption and every other agency which in any form is concerned with the larger use of baker's

products. The rim is the common purpose in the accomplishment of which all agencies join hands with the group outside the industry in building a better race. It will be easy with such a wheel to make rapid progress. Criticism will be crushed, obstacles surmounted and the baking industry advanced more rapidly than we have ever thought possible. The one essential to the carrying of the message from the Institute into the home is a well organized, always functioning baker's club which understands why it exists and how it should work.

The Trade Promotion Department of the Institute will furnish every baker with a complete plan for organizing and carrying on the work of such a club. It will furnish material for consideration and discussion at club meetings, it will suggest speakers and will outline means by which to make contacts with the interested group outside the industry. It will interest the leaders in women's work in the efforts of the club to solve the problems of malnutrition. Read the story "Selling National Vision" in *Baking Technology* for last month and vision a thousand Commissioner Bundesen's telling a similar story before a thousand Dough Clubs all over this broad country. Vision the value of such support and then if you can, build in your community another Dough Club through which the message of the baker as the provider of food for the race may be broadcast to every consumer.

I have just read the article furnished from the American Institute of Baking to the Nation's Health on the "Life Expectancy of Standard Foods." It has aroused me all over again to a sense of responsibility that life insurance in the form of a complete food should be provided by the baking industry.

—Elwood M. Rabenold,
New York City, N. Y.

Out of the Past

AQUAINT book has come to my desk from Mr. A. Hudson of the Home Bakery, Byng Inlet, Ontario, Canada. It is J. D. Hounihan's "Bakers and Confectioners' Guide and Treasure. A Practical Guide on the Art of Bread, Crackers, Cake and Pastry Baking." It contains 361 pages and was copyrighted in 1877. Mr. Hounihan laments the fact that altho other trades of not nearly so much consequence as the baking trade have dozens of books, there is hardly one printed on baking. He decries the secrecy with which the baker surrounds himself, and speaks of the high prices he had to pay for recipes, which was not surprising when it is taken into consideration that the baker frequently made his own mixes in the privacy of his room, no one else in the shop being made familiar with the procedure.

His advice to young bread and cake bakers is to urge them to be proud of their trade and respect it for few mechanics get better wages than good bread bakers. These range from \$12 to \$18 per week for bread and cracker bakers, while cake bakers receive from \$10 to \$15 per week. To help them with their work he has gathered recipes from bakers who are well known in their profession and gives them minute instructions for decorating cakes, which are not different from those in use today, and for concocting various dainties which would please even the most fastidious modern palate.

Under the chapter, "Substitutes for Flour" appears a recipe which would bring joy to the heart of the brown bread fan. It is for an "All Bran Bread" made of 7 pounds 7 ounces of bran and pollard, 14 quarts of water, 3 pints of yeast and 28 pounds of flour. The loaf when finished, will weigh "one-half more than the same quantity of flour would, without the addition of the bran."

Although the industry has practically been revolutionized since the time Mr. Hounihan published his book, the trade in general, echoes his complaint that the literature on baking is still being neglected. The fields of baking chemistry and baking technology have not yet been fully explored, although a few brave spirits in our country and abroad have done some splendid pioneer work.

—R. E. P.

Henry Ford Says, —

"The whole secret of right eating resolves itself into a choice of the right combination of foods.

"A study of right combinations of foods is now being made by scientists in my laboratory. It is the most important phase of the entire research work, for upon these combinations depend the physiological welfare of the human race. Some important general principles already have been worked out.

"Several years' research work has been done with employes of the Detroit plant assisting science by volunteering as subjects of study or experiment. As a result, we are able to make certain generalizations with regard to ideal foods for the three daily meals.

"The greatest dietary sin of Americans is their love of sweets. The caloric value of sugar is very high, but many eat an amount of it altogether out of proportion to the foodstuffs they consume which contain chemicals required by the body. Americans need a simpler diet."

A Good Custom Now

It was a good old custom for god-fathers and god-mothers every time their god-children asked their blessing to give them a cake which was called a gods-kichell. It is still a proverbial saying in some countries, "Ask me a blessing and I will give you some plumcake."

BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

H. E. BARNARD, Editor

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We Work Together

To win through knowing our markets and developing their full potential possibilities, a higher place for the baking industry in the great family of America's business life.

Our School of Baking

THE graduating of the eighth class of bakers turned out by American Institute of Baking into the industry took place in April, and so we finish another chapter in our progressive program. But, unlike so many chapters we are prone to think about, this one is not closed. It is in itself a new chapter and a new step for the industry because from now on these graduated students are going forth into the industry with new enthusiasm and a world of new ideas.

To those left at the Institute, who have helped teach and train these bakers of tomorrow, is sorrow at the severing of these personal friendships and the giving up of contact with the inspirational enthusiasm of this human parcel of energy, but with it gladness in the belief of their part in the work well done and joy in the anticipation of results to be accomplished by these same students, in the years to come, for the industry which they love. Nevertheless, the

sorrow of closing this chapter is quickly forgotten in the thought of opening the jewel box of the future, in the form of thirty-six students, who are at the present beginning their work as the ninth class. Herein is wrapped new problems, new ideals, newer vision, and a responsibility which will demand close attention.

To me, the most noticeable thing in connection with the graduating of this class is the marked difference in sentiment toward the School of Baking today and the sentiment when the first class was put to work.

Do you realize that this eighth class has carried out with it approximately its two hundred and fiftieth graduate, and what happens? Some are absorbed by the millers to do laboratory work, to call on bakers with their newer knowledge; the yeast people are continually drawing from these ranks to serve them in the field. But the majority find their opportunities in the bakeries themselves, and in the three years just passed many of the students graduating from the School of Baking have converted one-oven shops into two-oven shops and built indifferent quality into first grade quality.

The School is open to every baker on equal terms. It has on tap a source of knowledge for every baker, except to those bound by inhibitions of prejudice, rancor, or ill-will that prevents acceptance of *any light*. Over all and with all the undertakings of American Institute of Baking have passed beyond the experimental stage, with much satisfaction to all concerned.

Each class has been happy in its privilege of leaving something material in the form of a memorial to the Institute. In this way these students are putting their mark on the Institute, while the Institute, by the work it has done for the students, has put its mark on their lives.

LEWIS F. BOLSER,
President.

Vale, Amice

I K. RUSSELL, creator and editor of *Baking Technology*, has left the baking industry for which he has worked so well to become the editor and organizer for the electrical industry. In this new field of work, which to some will seem far afield from his efforts for the baking industry, Mr. Russell brings his unrivaled skill as a journalist and teacher, founded on his early training under David Starr Jordan at Leland Stanford University, broadened by years of splendid successes in the New York newspaper world and in special governmental activities during the strenuous year of the great war, and rounded out by the unrivaled record he has made as editor, advocate and spokesman for the baking industry.

His friends, and he has made a mighty host of them, his associates in the Institute of Baking, and indeed the whole baking and milling world he has so splendidly served, while regretting his resignation as Editor of *Baking Technology* and spokesman for our industries, congratulates the wonder world of electricity which he is entering in the accession of so vivid and forceful a writer, and wishes for him a brilliant success in his new field of effort, and every happiness which can come to one whose life as we so fully know it is consecrated to the duty of creating a finer and better word to live in.

H. E. BARNARD.

One Hundred Years Ago

IN 1821, bread was made by bakers in a 42-ounce loaf which sold for 12½ cents. A workman at that time could purchase 340 ounces of bread with his day's wage, but in 1923, a workman could buy 1,200 to 1,500 ounces of best white bread with his earnings for a day. Bread is today one-

fourth of the price it carried one hundred years ago.

Science and Health

SCIENCE is the law. By the use of science physicians, health authorities, nurses and laymen have stormed the citadel of infectious disease and routed the plagues of human life—smallpox, diphtheria, typhoid, yellow fever and scarlet fever, and these dread diseases of children and adults are now fully preventable and wholly unnecessary. A case of typhoid fever is a conviction for carelessness and a death from diphtheria infection in these days of antitoxins is not an act of Providence but neglect by the doctor.

There is, however, a greater menace than infectious disease hovering close over our children, the menace of malnutrition. And insufficient food, bad home conditions, and too little rest and sleep exact an enormous toll from the very foundations of society. When from 30 to 50 percent of our children are undernourished, how efficient will they be when they reach adult life a decade or two hence?

To bring health and happiness to every child, to build strong bodies and normal minds, to shape now the material which will constitute society in the future, is not alone the task of mothers, physicians and teachers. It is the baker's duty too. He plays a major role in the drama of civilization. Does he yet realize the value of his loaves in the nutrition of the child? Has he joined forces with his health officer, with Parent Teacher Associations, with women's organizations, with American Child Health Association, with all the agencies, whether they are local or national in character, which are working for children because more than our mines, more than our lands, more than our forests, our children are our greatest national asset?

Quality Pie in the Making

Selected Fruits and Carefully Made Crusts Explain the Quality of Bakers Pies

By ROSCOE H. SHAW

Department of Nutrition, American Institute of Baking

"You that from pliant Paste wou'd Fabricks raise,
Expecting thence to gain immortal Praise,
Your Knuckles try, and let your Sinews know
Their Power to Knead, and give the Form to Dough,
Chuse your Materials right, your seas'ning fix,
And with your Fruit resplendent Sugar mix;
From thence of course the Figure will arise,
And Elegance adorn the Surface of your Pies."

From "Art of Cookery," published in London in 1709.

NOTWITHSTANDING the halo of romance that has been woven around the home baking of pies, it is laborious work and one that the housewife would gladly delegate to the baker if—and this word "if" here has full meaning—she could purchase pies properly made. Bakers' pies in some sections have not earned a good reputation. To many they picture a hard, tough crust, enclosing a dry, tasteless filling. The larger pie makers have been keenly alive to the need of quality, but some of the smaller ones, who make pies only as a sideline, have not paid as much attention to quality as they should. It is for them, particularly, that this article is written.

To make a quality pie, the first requisite is high class materials. A quality pie can not be made of poor materials, no matter how much skill is used in preparing it. On the other hand, good materials will not result in a quality pie unless skill is used in its preparation. Another thing not to be lost sight of is the fact that few prepared foods deteriorate more quickly than do pies; so they must be delivered to the customer within a few hours after being taken from the oven.

The Crust

"The crust is the bulwark of the pie and it behooves the baker to give special attention to this part of pie-making," says Henry Ward Beecher in his delightful sermon on the apple pie. "But O be careful of the paste! Let it not be like putty, nor rush to the other extreme, and make it so flaky that one holds his breath while eating it for fear of blowing it away. Let it not be plain as bread, nor yet rich like cake."

Quality pie crust can be made from either bread flour or pastry flour. Each has its advocates, depending on whether the crumbly or the flaky pie crust is desired. Pastry flour contains less gluten; consequently a smaller amount of shortening is required than with bread flour. This sort of flour yields a crumbly pie crust while with bread flour a flaky crust results.

As to the fats, various kinds may be used. Butter is of course the most expensive, yet it is the least desirable for it contains less fat per pound than do any of the others, with the exception of margarine. Pure lard will make an excellent crust but the best results are usually

obtained by the use of good vegetable shortening, preferably solidified, since it can be "worked in" better than the liquid oil; a good crumbly pie crust can be made, however, with the liquid vegetable oil.

Local conditions must regulate the proportion of flour and shortening. Whereas in some communities a very short crust is demanded, in others a tougher crust is preferred. The baker must be governed by the taste of his particular locality. Some people like a crust that falls to pieces when touched with a fork; others sing praises to the crust that will "stand up under trying conditions." The writer was much interested not long ago in the experience of a large pie baker who it seemed had contracted to supply pies to a jail. He furnished them his regular grade of pies which were very good pies. Much to his chagrin they proved unsatisfactory. After some questioning he found that the kind of pie they wanted was one that could be passed through the bars and "eaten out of hand". The next consignment of pies were made with a much tougher crust and a very stiff filling. There were no further complaints from those customers.

Some communities prefer a crumbly crust while others want the flaky kind. It will repay the baker desiring to establish a reputation for quality pies to make a survey of his community and even experiment a little in order to learn just what sort of crust is preferred.

The crumbly variety is easier to make. A good grade of pastry flour is required and less shortening is used than for the flaky variety. For both kinds of crust a shorter dough is used for the top crust of the two-crust pies than for the lower crust, while for the crust of the "open-face" pies such as custard, lemon, cream, etc., still less shortening is needed.

The following formulas will result in

quality pie crust if the materials are properly combined:—

Bread flour		Pastry flour	
Top crust		Top crust	
10 lbs. flour		10 lbs. flour	
7 lbs. shortening		5 lbs. shortening	
2½ qts. cold water		2½ qts. cold water	
(approx.)		(approx.)	
2 ozs. salt		2 ozs. salt	
Bottom crust		Bottom crust	
10 lbs. flour		10 lbs. flour	
6 lbs. shortening		3¾ lbs. shortening	
2¾ qts. cold water		2¾ qts. cold water	
(approx.)		(approx.)	
2 ozs. salt		2 ozs. salt	

The ingredients should be cold when combined. The amount of water required will vary of course with the absorption of the flour and the amount of fat used. When using bread flour for flaky pie crust it is absolutely imperative that all the materials be ice-cold when combined and that the water be ice water. This kind of crust also requires a hard shortening such as hard vegetable oil or lard. An oil or soft fat will not give good results.

If the condition of the trade is such that a tough crust is required, the shortening may be reduced to meet the requirements.

Pie crust should be handled as lightly as possible. The flour and salt should be sifted together and the shortening worked in until the mixture has the appearance of a coarse meal. The water is added slowly to the flour mixture and worked just enough to obtain a paste that will leave the sides of the mixing bowl. The fingers may be used to work in the shortening for the crumbly crust but they must not be used for the flaky crust because the heat from them is sufficient to soften the fat.

It is better to chill the paste before rolling because this makes it easier to

handle and the crust will be lighter after baking. This is especially true with flaky crust, in which case even better results are obtained if it remains in the refrigerator over night.

In rolling out the crust, light, even strokes are best. Cut off a chunk of the dough large enough for a single crust; lightly flour the board and rolling pin. Roll one way and then the other so that it will form a round sheet. When reaching the end of the sheet allow the rolling pin to roll off into space rather than to strike the board. An expert can cut off a chunk of dough and roll it in such a manner that it fills the pan without trimming. The sheet should be uniformly thick throughout. When the rolling is completed it should be half folded across the rolling pin and then placed over the pie pan which has been lightly floured or greased. In fitting to the pan care must be taken to exclude the air and at the same time not to stretch the dough. If a double crust pie is being made the excess dough is removed by running a knife around the top of the pan. If for an open-face pie, the dough is cut from one-half to one inch wider than the pan (the shears are useful here) and this excess rolled up and pinched together for the rim. The upper crust, made from a shorter dough than the lower one, is fashioned in much the same manner except that it should be a little thicker. It should be scored so that the steam may escape while baking, which scoring may take the shape of a design perhaps to indicate the kind of pie or the name of its maker. After the filling has been added the top crust is put on and crimped to the lower one. If the lower crust has been previously moistened with water around the edge, a more perfect union between the two crusts is possible.

The Filling

“Unless some sweetness at the bottom lye,
Who cares for all the crinkling of the
Pye?”

Many of our customs and habits are governed by the seasons. This holds good for our habits of clothing, recreations, and even our moods. To a very great extent is this influence manifested in our habits of eating. As spring and summer come along we find our tastes running towards lighter foods and greater variety for which new vegetables, fruits and berries offer the source. One of the more popular ways of satisfying our longing for fruits and berries is with pies.

The earliest of all spring pies, in our climate at least, is the rhubarb pie. A little later the various berries begin to appear and then the peach.

To tell how to make the whole catalog of quality pies is far beyond the scope of this article so it will be limited to a few of the seasonal pies and one or two of those that have earned their places for “all the year round.”

Quality pies require the best of berries and fruits. Good pies may be made of canned berries or dried fruits, but quality pies are made from fresh. While berries will shortly be in season and berry pies reach their peak of popularity it must not be overlooked that these pies are demanded in somewhat lesser degree all through the year. The best way for preserving berries for pie-making is not by canning but by freezing. It is not of course to be expected that every baker who makes pies has cold storage rooms in his plant, but the chances are good that even in the smaller town in which his plant is located there is a cold storage warehouse. The berries that are frozen and kept in that condition until wanted, even if for months, lose none of their

delicate flavor and after thawing can be used in pie baking exactly as if they were fresh. For the baker who wants to make quality pies it will pay him to investigate the cost of buying berries in season and storing them frozen in a local cold storage warehouse until wanted. He may be surprised to find that the cost is actually less than the canned variety and even if it should prove a little more his patrons will not be loath to pay the difference for the improved flavor that his quality pies will have.

Strawberry, blueberry (or huckleberry), blackberry and raspberry fillings are prepared in practically the same way. If the temperature of the oven is well controlled they may usually be cooked with the crust. Blackberries, however, sometimes require pre-cooking. Some bakers prefer to pre-cook all berries. Quality pies may be made either way.

A stiffener—usually starch, but sometimes tapioca flour—is generally used. The quantity of this material used must be governed in a measure by the tastes of the consumers for here, too, tastes vary. Some like pie that may “be eaten out of the hand without running up the sleeve,” while others prefer juicy ones. A happy medium will usually prove the best seller—a pie which has a fairly stiff interior but still “runny”. In no case should enough stiffening to mask the flavor of the filling be used. Some good cooks put a layer of cracker or cake crumbs on the lower crust before adding the filling so that the juice will be partly soaked up.

The quantity of sugar used depends, of course, on the tartness of the berries or fruit. It also depends somewhat on the requirements of the trade. The tendency in recent years has been to add more and more sugar. The quality pie must not be so sweet that the natural flavor of its filler is marred.

In the following formulas the proportion of starch and sugar should be regarded only as approximations.

Rhubarb Pie

Young rhubarb does not require peeling, otherwise remove the skin and then cut into small pieces. Mix 1 to 1¼ pounds of granulated sugar, 3 ounces of corn starch, a little salt and cinnamon or nutmeg and add to each quart of rhubarb. The lower crust may be sprinkled with bread, cracker or cake crumbs before adding the filling. Rhubarb pies are usually made with a top crust which may be of “lattice work.” They are sometimes made without top crust.

Berry Pie

Fresh berries	10 lbs.
Granulated sugar.....	2½ to 3 lbs.
Cinnamon	½ oz.
Corn starch	3 ozs.

The sugar, cinnamon and cornstarch should be thoroughly mixed and then added to the berries which are now ready to put into the pies. As before stated, cracker or cake crumbs may be sprinkled over the lower crust before adding the berries.

If it be desired to pre-cook the berries put them with 3 lbs. of sugar and 3 pints of water into a copper kettle which is placed over the fire and brought to a boil. Meanwhile mix 8 ounces of sugar with 6 ounces of cornstarch and stir into 1 pint of water. When the berries begin to boil, add the sugar, starch solution very slowly with careful stirring. Remove from the fire and pour into a clean vessel. Three quarters of an ounce of cinnamon may now be stirred in. The filling must then be cooled. Filling warm enough to melt the shortening in the crust must not be used or a tough crust will be the result.

The Apple Pie

No other pie can approach the apple pie in popularity. It has earned for it-

self the distinction of being pre-eminently the all-the-year-round pie. The baker's reputation as a pie baker will be based very largely on his ability to put out quality apple pies.

Quality apple pies are made from apples not over-ripe and having a tart flavor. In making such pies it will well repay the baker to be generous in the quantity of apples used. Apple pies have a better flavor and far more attractive appearance when rounded high. Of course such pies cost more to make but they will also bring a higher price.

For quality apple pies the apples should not be pre-cooked. The amount of sugar and spices used should not be sufficient to obscure the flavor of the apple, and if a stiffener is necessary in case the fruit is very juicy, it must be used sparingly.

Apples	10 lbs.
Sugar	2 lbs.
Cinnamon or nutmeg.....	¼ oz.

The apples should be sliced into rather thin pieces, mixed with the sugar and spices and then placed in the pie. Another and perhaps better way is to place the sliced apple on the crust and then sprinkle the mixed sugar and spice over it. Some prefer to add butter in small pieces on top of the apple. About 2½ ounces of butter for 10 pounds of apples are used.

The Custard Pie

This pie is another all-the-year-round pie. The custard pie represents a class of pies including pumpkin, squash, sweet potato, etc., which, on account of the milk and eggs they contain, are very high class foods.

Custard pies are best baked with the crust, differing in this respect from other "open face" pies such as lemon cream, etc. They are somewhat difficult to bake but if that phase is mastered no stiffening is necessary or desirable.

18 to 24 eggs
1 gal. milk
1¼ pound sugar
½ oz. salt
⅓ oz. cinnamon or nutmeg

The eggs are beaten and the sugar, salt and spice added. The milk is then mixed in and poured into the crust.

Baking

The baking of quality pies requires close attention. Pies should be placed in a very hot oven so that the shortening will be cooked into the flour before becoming oily; otherwise the crust will become tough instead of crumbly or flaky. As soon as the crust begins to brown the temperature of the oven should be reduced. The temperature for the baking of pies depends somewhat upon the nature and size of the pies. For a large fruit pie the oven should be at about 400° F. for the first 10 or 15 minutes and then reduced to 350 degrees or less. Custard pies are among the hardest to bake. They require the same high temperature at first but afterwards it must be reduced to 325 degrees F. so that the contents will not boil, otherwise a wheyed or "livered" pie will result.

Gluttony Going

Our observation leads us to believe that gluttony is decreasing rather than increasing. Today few persons eat such a hearty breakfast, for example, as was customary twenty years ago. Many persons nowadays eat no luncheon at all. Thousands of perfectly healthy individuals subsist on greatly restricted diets.

It used to be true, perhaps, that "everybody ate too much;" but today it is more likely that many persons do not eat enough. They starve themselves into anemia.

—Herald-Examiner.

White Flour Builds Better Bone

Old Nutritional Notions Overthrown by Studies of Cereal Diets

By EDWARD MELLANBY, M. D.

Of the Medical Research Council of Great Britain

SUPPLEMENTING the report of the classic work of M. Mellanby on the influence of diet on tooth structure as published in *Baking Technology* for January is more strong evidence. It gives us much satisfaction to be able to print a summary of another bulletin from the Medical Research Council of Great Britain abstracted by Dr. S. J. Crumbine, Field Secretary, Executive Committee, Conference of State and Provincial Health authorities and acting head of American Child Health Association, in which Edward Mellanby shows even more conclusively than in the earlier papers how the amount and type of cereals eaten affect bone—calcification.

A recent Bulletin from the Medical Research Council of Great Britain, by Edward Mellanby, recounts extensive research in the production of Experimental Rickets, featuring "The Effect of Cereals and Their Interaction with other Factors of Diet and Environment in Producing Rickets". The experimental work described demonstrates that various common cereals have different effects on the growing animal, and that these differences cannot yet be explained on the basis of their known constituents. An abstract of the report follows:

"Evidence has been given which shows that some cereals and cereal products have a powerful interfering influence on bone-calcification, varying with the amount and type of cereal eaten and with the general make-up of the diet.

"When the diet is deficient in anti-rachitic vitamin, increasing the amount of cereal brings about worse-formed bones

if other factors of diet and environment remain constant. Qualitative differences between the effects of the different cereals are also great. Among those substances tested oatmeal has preeminently the worse influence on bone-formation, and after that come maize and barley, rice, and wheaten flour, the last having the least detrimental effect. There is but little difference between the rickets-producing effect of rice and flour. The germ of wheaten flour, when added to the diet in sufficient quantities, also interferes with bone-calcification.

"The action of cereals on bone calcification is antagonized to varying degrees by foodstuffs containing the anti-rachitic vitamin. As might be expected, cod-liver oil is the most effective substance in this respect, and is capable, even in small quantities, of preventing the cereal action. Whole milk, in fairly large quantities, and egg yolk are also potent antagonists to the cereal effect, but butter is of comparatively small value unless it is accompanied by a fairly high calcium intake. Both calcium carbonate and calcium phosphate work well in conjunction with the vitamin of butterfat. The anti-rachitic effect of separated milk, either when working in conjunction with butterfat or in an independent way is more potent than can be accounted for by its calcium content alone.

"Evidence is also given to show that the detrimental effects of cereals, which become prominent in diets deficient in anti-rachitic vitamin, can often be antagonized to some extent either by exposing the animal eating them to some source

of ultra-violet radiations or by exposing the cereal itself to the same radiations.

"After many attempts had been made to explain this action in terms of known constituents of cereals and to find out the nature of the causative agent or agents, some evidence has finally been obtained which suggests that a substance in oatmeal which interferes with the laying down of calcium in bones is associated with the fatty acids.

"Further work is necessary to establish the nature and properties of this cereal constituent and also to determine its mode of action. In the meantime evidence of the presence of such a substance helps towards the solution of a difficult problem, namely, that oatmeal, which contains more calcium and more phosphorous than other cereals tested, should, in the absence of sufficient anti-rachitic vitamin, result in the deposition of the smallest amount of these elements in growing bones. White flour contains much less calcium and phosphorous than oatmeal, but results in better bone-formation, when the anti-rachitic vitamin intake is deficient, because it contains much less of the substance or substances interfering with ossification.

"Since the anti-rachitic vitamin supplies in the food and exposure of the animal or of the food eaten to ultra-violet radiations tend to conserve ingested calcium and phosphorous for the use of the growing organism, and since the cereals work in the opposite direction, it is evident that the amount of calcium and phosphorous in the food is of but secondary importance in the control of the deposition of these elements in growing bone, although, of course, there must be a sufficiency of these salts for the formation of perfect bones. In view of the evidence of interaction and balance among food constituents provided by this investigation, the value of the expression optimum cal-

cium content of a diet so commonly used in dietetic descriptions and discussions nowadays must be doubted. The optimum varies every time the other elements of the diet are changed.

"There are one or two practical points of dietetics which arise out of these experimental results. The challenge, for instance, immediately may be made, if oatmeal is so detrimental to bone-formation, how is it that fine races of men have been reared on diets of which this cereal forms a large part? If these results apply to man, as they almost certainly do in the case of the teeth and probably therefore, as regards other tissues (M. Mellanby, 44b), then it is highly probable that the diet of these people also included much of foods rich in anti-rachitic vitamin, as, for example, milk, eggs, fish of the fatty variety, including herring, salmon, mackerel, etc. In tropical countries where cereals such as rice, maize, millet, form a large part of the diet, the sunlight is no doubt also an important factor in antagonizing their detrimental influence. Whether these answers are entirely satisfactory or not only further investigation can determine, but the present work does show that perfect bone-formation can be obtained even when large quantities of oatmeal are eaten if the rest of the diet be adequate. On the other hand the worst cases of malnutrition seen in human beings can be easily reproduced in animals by feeding them on foodstuffs which bulk largely in the national dietary along the lines described in this investigation. Apart from extreme malnutrition, however, it would appear not improbable that in this country, where the average diet is either deficient in or contains a border-line quantity of anti-rachitic vitamin and calcium, and where sunshine is negligible, the ingestion of oatmeal during pregnancy and lactation of women, and in growing children, does much harm.

More Anti-Fat Breads

By C. B. MORISON

Of the American Institute of Baking

SINCE the publication of an article in *Baking Technology** on the composition of anti-fat or special breads claimed to be of value in the reduction of weight, the prevention of obesity, and various other nutritional disturbances, the Institute has examined several other samples of these products, the analyses of which are reported below:†

similar to that used in the preparation of certain diabetic foods, also finds a place in these formulas. Laxative compounds, among which castor oil is conspicuous, are sometimes used, and also other compounds supposed to have cathartic properties.

An interesting development recently came to the writer's attention in which a

Table I. Analyses of Anti-Fat Breads—As Received %

	5959	6242	6436	6605	6786	7189	3612	3867
Moisture	36.59	32.89	29.78	35.44	32.49	30.63	37.75	37.46
Protein (Nx 6.25) ..	10.82	14.46	14.46	9.18	15.86	6.17	9.11	9.50
Nitrogen free ext. .	42.08	47.54	50.15	48.63	46.41	53.67	46.17	46.16
Crude fiber	3.21	0.87	1.14	1.99	0.97	1.35	1.81	1.70
Fat	1.71	2.09	2.13	2.18	2.16	5.51	3.25	3.27
Ash	5.59	2.15	2.34	2.58	2.11	2.67	1.91	1.91
Starch	...	36.14	37.97	32.89	31.61	20.79	35.27	36.04
Calories per lb.	1029	1170	1259	1138	1218	1310	1136	1143

Table II. Analyses of Anti-Fat Breads—Dry Basis %

	5959	6242	6436	6605	6786	7189	3612	3867
Moisture	...	...	...	...	...	...	...	...
Protein (Nx 6.25) ..	17.06	21.54	20.59	14.22	23.50	8.90	14.64	15.19
Nitrogen free ext. .	66.36	70.85	71.43	75.31	68.75	77.36	74.17	73.81
Crude fiber	5.06	1.29	1.62	3.09	1.43	1.95	2.90	2.72
Fat	2.70	3.11	3.03	3.38	3.20	7.94	5.22	5.22
Ash	8.82	3.21	3.33	4.00	3.12	3.85	3.07	3.06
Starch	...	53.86	54.08	50.95	46.82	29.97	56.66	57.62

The trade names of these breads are not stated here, but members of American Bakers Association may obtain the names corresponding to the sample numbers by applying to the Institute.

The ingredients used in the formulas of these breads are in general, coarse flours of the cereal grains, especially wheat and rye. Sometimes ground flaxseed is used. Ground agar agar, or cellulose material,

manufacturer of a well-known patent remedy for obesity was anxious to use the active ingredient of this preparation in bread formulas, because the sales of the original patent medicine had lately fallen off, and a new outlet was required in order to maintain profits. The active ingredient was a preparation that should only be used under medical supervision, if at all, and the inclusion of it in a bread

* *Bak. Tech.* Vol. 3, p. 304, 1924.

† The results reported were obtained by Messrs. Luckow and Gant of the Analytical Laboratory.

formula would be nothing less than a therapeutic perversion.

Table I gives the proximate analysis of eight samples of anti-fat bread as received at the laboratory and Table II the results when calculated to the dry basis.

The protein content of these special breads is considerably higher than that of white bread, except in 7189, which is somewhat lower than that ordinarily found.

The nitrogen free extract, which includes starch, sugar, dextrins, other soluble carbohydrates, and pentosans, is somewhat lower than in ordinary white bread, but is similar to that of many gluten, bran, and whole wheat breads.

The crude fiber is similar to that found in bran and whole wheat breads.

The fat (total lipid material) shows a considerable range; the high figure (7.94 per cent) on the dry basis of bread 7189 is difficult to explain, except by the direct addition of high amounts of fat to the dough or to the use of materials containing a high percentage of ether soluble extract, as is found in various seeds and their products.

The high amount of ash in 5969 was apparently due to the addition of common salt. This sample of bread possessed a very salty taste and contained 2.46 per cent sodium chloride on the dry basis.

The starch content of the samples was over 50 per cent on the dry basis, except in 6786 and 7189. The 29.97 per cent of starch in 7189 is similar to that of many ordinary gluten breads found on the market.

The crude fiber showed considerable variation among the samples, as might be expected, which is due to the use of coarse flour and bran, although some ordinary bran breads carry as much fiber as the maximum shown by bread 5959.

The fuel value, calculated as calories per pound of the bread as received, is

similar to that of ordinary bread except in 5959, which was 1029. This is considerably lower than ordinary white bread of a similar moisture content.

In general, the proximate composition of these breads is similar to ordinary whole wheat, bran and gluten breads.

It is interesting to note that the advertisers of these breads for the prevention of obesity and other evils always recommend that they be used in connection with a typical low calorie diet of the character commonly employed in weight reduction treatments. In some cases special exercises and baths are recommended for those using these special breads.

In a former article we have pointed out that those anxious to "get thin" may do so on ordinary white bread without resource to special products intended to convey the impression that white bread is responsible for obesity.

Thick Crusts

IF YOU have trouble in your bakery with crust that is too thick, what do you do to remedy it? The first thing checked up by an experienced bakery superintendent is the item of sugar. No sugar or too little sugar will result in a thick crust. The next item to check up is the age of the dough. The older the dough the less sugar it has, for the very reason that yeast manufactures the gases which leaven the batch out of its sugar. Hence there will be less sugar in an old dough than was put in by the baker when the batch was mixed. The dry skin that forms over dough in the pans or in the proofers where the air is too dry is still another cause of thick crusts. And this is the worst cause of all because such a crust is repellant to the appetite. A cool oven is the final cause of thick crusting. Check these items one at a time and you are sure to find your trouble before you get through.

May, 1925]

BAKING TECHNOLOGY

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Standards in the Bakery

The Official Bread Scoring System Has Standardized Methods of Judging Bread Quality

NO GOVERNMENT activity has been so generally applauded as the efforts of the Department of Commerce to bring greater prosperity and more generous profits to industry through the elimination of waste. Thousands of manufacturers and scores of industries which thought they were well organized and efficiently operated have, with the co-operation of Secretary Hoover's experts, found that their business was burdened with wasteful practices which demanded excessive capital investment and reduced production. And so the manufacturers of bedsteads, paving bricks, hardware, barrels, lumber and many other essentials of modern life have simplified their processes, cut out duplications, reduced varieties, and made savings aggregating many millions of dollars.

But although these savings have been possible in other industries, few changes have as yet come into the bakery. The weight of the bread loaf has been fixed by many state statutes, but the shape and size of the loaf has never been made uniform. Every baker uses the pan and makes the loaf his customers most desire. Tastes may be without basis of fact or flavor, but no baker has yet successfully forced a change in the public's opinion as to what sort of bread it wanted.

Bread formulas are to some extent being standardized as machinery, materials and methods are simplified and standardized. Much more progress in these directions is possible. The milling industry has been very successful in its efforts to produce a standard flour. The yeast manufacturer has almost completely eliminated the hazards which once made yeast a wild biological product, nonuniform

and unstable, and yeast today is as dependable as flour, or sugar, or shortening.

In one direction, however, the baker has made definite progress, and that is in the adoption of a standard method of scoring bread. Prior to the work of American Institute of Baking, which led to the adoption of an official system of scoring bread by the American Bakers' Association, there was no uniform practice. While judges of butter, of cheese, of sheep, hogs, horses, cattle, dogs, poultry, and indeed of all of the aspirants for prizes at county fairs, had a definite rule of action, the judges of bread were forced to hesitate between a score of systems, none of which was wholly good, even for home made bread and none at all satisfactory for commercial or baker's bread.

But with the co-operation of the authorities on bread, in government departments, in the Home Economic Sections of the universities and in the milling and baking laboratories, the Institute score card was drafted. And it was then published and criticised and revised before it was finally adopted. Today it is the only official system for use in scoring bread.

In a recent letter acknowledging the receipt of a supply of score cards sent him for use in the study of flours, J. H. Shollenberger of the Bureau of Agricultural Economics of the United States Department of Agriculture wrote:

"We believe that for commercial baking your system of bread scoring is a vast improvement over the other systems with which we are familiar. There is great need for the adoption of uniform methods of judging and inasmuch as your system is a meritorious one and is already used

by a goodly portion of the trade, much good would result if it were universally adopted."

Of course, any method of comparing one loaf of bread with another which will give definite information is helpful. But unless the results of the comparison can be translated into some common basis of reckoning, they are of use only to the judge and then only at the time they are made.

It is equally obvious that any system of scoring based on a variable datum point is of little value. There has been, for instance, a system used in which a standard loaf, well made, of good materials, is given a score of 100, and against which other loaves are scored. Some loaves under this system score more than 100, others less than 100. Some loaves, deficient in volume, color or texture, are better than the standard in other respects, and so by offsetting deficiencies by gains a loaf with obvious faults or decided merits may in the final summing up score 100.

This system of scoring means something, of course, to the man who scores it. By its use he can average the results of his baking in a way satisfactory to himself. But the baker who receives a report that his bread scores 100 or 96, or 102, obtains nothing except figures which he cannot interpret, but which to the layman, who accepts a grade of 100 as perfect, whether it is marked on an examination paper or set up as an evidence of the highest food quality, are deceptive and misleading.

The product of the thousand barrels of flour baked each year into every form of bread by the students at American Institute of Baking is all scored by the official system. The thousands of loaves of bread sent to the Service Laboratory of the Institute are scored by the official system. Every loaf baked from the flour samples submitted to the Institute for analysis and

appraisals as to its baking quality is scored by the official system.

And so throughout the baking and milling industry the official standard is being used in measuring bread quality. And in this way a definite standard has been recognized by the baker.

Other standards will be devised for controlling bake shop operations. If they are practical they will be adopted. In the course of time customs may so change that a package of bread will be as uniform in weight, shape and appearance as a carton of butter or a bottle of milk. But until that time does come every baker will make as best he can the type of bread his customers want.

We Thank You

This splendid equipment of the latest types of bakery machinery has been provided the School of Baking by the Bakery Equipment Manufacturers Association. The entire baking industry which profits so largely from the better training of men who are to become its leaders, owes its sincere thanks to the earnest, interested and helpful service of George E. Dean, the representative of the Bakery Equipment Manufacturers Association on the Committee of American Institute of Baking, to the members of his Committee and to the Manufacturers who have cooperated with him in providing for the School the splendid equipment by which the training of our students is made possible.

Cooperation

The American Waxed Paper Association, through its Institute, is at the disposal of the baking industry to work out any problem in bread wrapping or the use of educative propaganda on bread wrappers. We send out a monthly bulletin which we should like to have the Institute receive.

—W. M. Brownell, Package Paper and Supply Corporation, N. Y. City.

A Little Conversation on Mold

*Most Molds Are Good, Some Are Excellent, but Bread Molds
While Wholesome Are Unnecessary*

By H. E. TURLEY,

Bacteriologist, American Institute of Baking

AS Mr. Jones, of the Jones Baking Company, was reading his morning mail he opened a letter which perturbed him very much. It was from a new customer who had made her first purchase of the Jones Quality Bread and very indignantly stated that her little girl had been made ill by eating three slices of bread which were moldy.

Mr. Jones, like every up-to-date baker, was ever ready to listen to a complaint of a customer and so he called Mrs. Orton on the phone and arranged for an immediate interview at which he told her he was very sorry that she had this incident happen with his bread, and asked to see the remainder of the loaf. She hurried to the pantry and brought in the bread box with its loaf of moldy bread, a few broken slices and its usual supply of crumbs. Mr. Jones knew the various bread molds on sight and at once identified it as green mold. He then explained that green mold was absolutely harmless to the human body and that the Japanese and Chinese had been using that mold for centuries to make the delicious soy bean sauce found in Chinese restaurants.

Mrs. Orton was easily convinced that it was not the bread that caused her daughter's illness and asked Mr. Jones' pardon for being too hasty in condemning his bread. During the conversation he noticed that there was a damp cloth in the bread box and inquired if she always kept a damp cloth over her bread. "Yes," she said, "I do that in order to keep my bread fresh and soft." He then explained

to her the nature of molds and mold infection. "Mold," he said, "is a living plant that will grow up on proper food material under suitable conditions of moisture and a favorable temperature. The mold plant produces microscopic 'seeds' too small to be seen with the naked eye. These microscopic seeds are present all around us and only need food material and proper conditions of moisture and temperature to supply them with a happy home and breeding ground. When you place a damp cloth in your bread box you are supplying them with one of the most important factors for their development. The mold spores are protected with a thin membrane and will not survive the baking temperature. So you see when bread leaves the oven it is sterile as far as mold is concerned."

Mrs. Orton was very much surprised to learn the nature of the molds that had appeared on various foods that she had prepared. She had regarded mold as some colored "stuff" that appeared and disappeared, she knew not why. A new world had been opened before her eyes, a world of microscopic living plants.

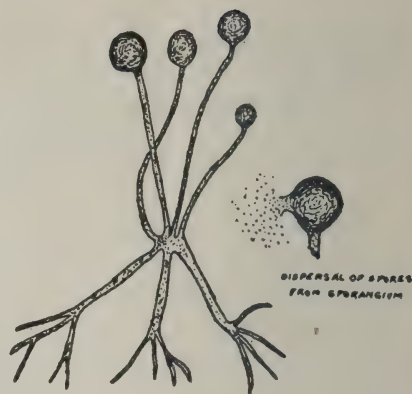
And then, with the incident of the moldy bread still fresh, Mr. Jones said, "Now, Mrs. Orton, if you so desire, I would like to show you our sanitary bakery." And Mrs. Orton who had never been on the inside of a large modern bakery was quick to accept the invitation. After arriving at the plant she was shown a large bright and clean room where all the bread ingredients were stored. The doughs were made up in a

room that she declared was more sanitary than the average housewife's kitchen. She was then shown the oven and wrapping room with its concrete floor and walls and ceiling painted a white enamel. "In addition to taking every sanitation precaution," Mr. Jones told her, "I store my wrapping paper in a clean, dry place and always cool my bread thoroughly before wrapping. When bread is wrapped too warm it 'sweats' and you have the same favorable conditions for mold growth that you have in 'a damp bread box.'"

Like other progressive bakers, Mr. Jones was always proud to show visitors his small but serviceable chemical laboratory. "The young man in here is a chemist with biological training," he said. "He analyzes the ingredients that are used in our bread. Once every three months he tests our water supply as to its bacteriological purity. The flasks that you see on the table contain the various common molds that sometimes are found on baker's products. These molds occur on bread when it is not stored properly in the grocery store or in the home. The molds contained in these two flasks are known as 'whisker' mold and brown mold. These molds will produce illness if eaten in quantity, but they are rarely found on bread and their musty odor and sour taste are sufficient warning of their bad character.

"The mold 'whiskers' is identified by its heavy, felt like cottony growth on the outside of the loaf. When it first appears it is white, later changing to a grey, greyish brown, and finally to a brown to black felt like growth. Embedded in this heavy mass of threads are the black spore pods that are ever ready to release thousands and millions of these microscopic seeds to infect new bread.

"The brown mold is noticed as a brown to black sooty growth on the surface of the bread. It is a low growing mold and



"WHISKER MOLD

HOW SPORES INFECT A BAKERY. EACH
OPENING POD DISPERSES FROM
500 TO 1000 SPORES.

is easily distinguished from the cottony like growth of 'whiskers'.

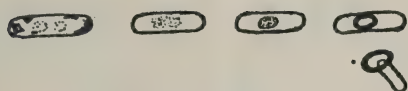
"The other common bread molds in the other three flasks are known as blue, green and orange molds and are not harmful to the human body.

"The blue mold is known to every baker and American housewife. It is found on bread, jams, fruit and even on old shoes lying about the basement. The color varies from a light blue to a bluish grey, bluish green and yellowish green. The spores are born on stalks arising from the threads of mold in a whisk-broom fashion.

"Green mold produces such a short rich green growth that it reminds one of a bright green carpet, or a bed of mold plants. The color is usually a bright rich green, being easily distinguished from other forms of mold.

"The color of orange mold varies from a pink to a salmon and orange. This type of mold is used by the natives of Java to mold the earth nut, which they consider a great delicacy.

"There is another bread disease that may occur in bread which is known as rope. This disease is caused by a microscopic plant known as a bacterium. The



FORMATION OF A

BACTERIAL SPORE

THE SPORE ENABLES THE ROPE BACTERIUM
TO SURVIVE THE BAKING TEMPERATURE.

source of the rope is usually in the flour for the bacteria are found in the crease of the wheat kernel and in the bran coatings. The bacteria that cause ropy bread do not like acid conditions for their development. Normal dough fermentation is an acid fermentation, so rope only occurs in cases of acute infection by the bacteria and in cases of abnormal fermentation. The housewife should not become alarmed, however, as ropy bread has never been known to cause any ill effects when eaten, even in large quantity. White rats have also been fed ropy bread with no ill effects. We have not been troubled with rope for many years. However, if it should appear, we can easily eliminate it by using a quart of 40 grain vinegar to a barrel of flour, giving the bakery a thorough cleaning and washing all utensils with hot vinegar water."

Mrs. Orton thanked Mr. Jones for the courtesy he had extended in explaining the diseases of bread to her and for the time spent in showing her how bread was

made in a modern bakery. She was astonished to learn how easy it is for the up-to-date baker to lessen the prevalence of bread disease by a few simple precautions which every baker follows if he desires to have satisfied customers and to keep abreast of the times. Needless to say Mrs. Orton left the Jones Baking Company a satisfied customer. She told her friends what she had seen and heard and they in turn told others until in that community the synonym for food excellence was Jones' Quality Bread.

A Queensland Visitor

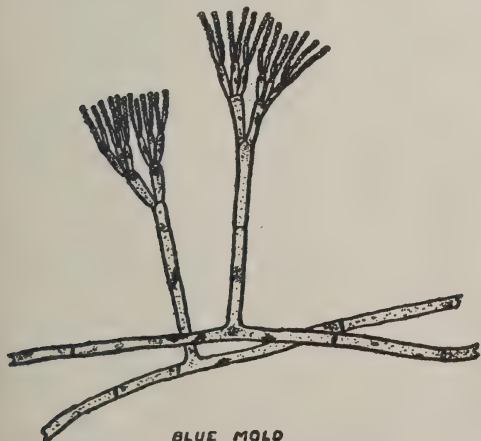
"Robert Paine, one of our prominent members," writes Thomas S. Dansteel, Secretary of the Master Bakers' Association of Queensland, "is leaving Australia for a long tour of the United Kingdom, during which he will visit America and your convention at Buffalo.

"We send you hearty greetings and trust that your convention will be another stepping stone in the advancement of the baking industry. Although so far away from you in this sunny Australia of ours, we have kindly feelings toward our comrades in our great industry.

"We tender your President and executives our hearty greetings. May their work and ideals come to fruition in every sense of the word."

Baking Technology for last month I believe is the best you have ever put out. President Bolser's message is magnificent. The article regarding dark bread is just what I have worked out from my own experience. I know that my family eats more than double the amount of white bread than any dark bread on any test, and I have thoroughly demonstrated this. I can only get them to take dark bread when I make it the only bread available.

—R. J. Workman, California Baking Co.,
San Francisco, Cal.



BLUE MOLD

A COMMON MOLD FOUND IN THE HOME.

A Half-Cent Coin May Benefit

*This May Be a Practical Way to Narrow the Spread Between
Wheat and Bread Prices*

BUT few commodities are now so cheap that it is necessary to split pennies in fixing their value. The price of butter and of eggs blithely jumps a nickel at a time and so used is she to the changing scale that the housewife never bothers to check up her grocery slips.

But in one particular, perhaps the only one left to us, and that is the price of a loaf of bread, we are still living on a pre-war basis. An increase of a cent in bread prices trailing the advancing wheat market, sets every editor hunting profiteers, while a decrease of a penny a pound in the cost of our basic food extracts thank offerings from vox populi contributors, who see in the distress of wheat farmers and bakers, a way to strike a financial balance which pays increased rentals, buys a new radio set and justifies a better car. The fact that on our present bread-eating basis a reduction of a cent a pound would save the average person less than \$2.00 a year,—the wages of a bricklayer for a single hour—is never noticed.

The baker, however, is seriously concerned over increased or decreased bread prices. His ability to make money in his business or to lose it is measured by that single cent. His ideas as to the need for a half-cent coin are well set out by S. S. Langendorf, a San Francisco baker who submits for the consideration of the bakers of the country his solution of the problem of flexible bread prices.

"We are of the opinion that the introduction of a half-cent denomination of coin would be an aid in adjusting bread prices whenever conditions warrant a change and so work to the better satisfaction of the public as well as the baker.

"Under the present coinage, retail bread prices can only be increased or decreased in units of a cent. Flour may fluctuate as much as \$2.00 a barrel and bakers are often prevented from raising the price of bread because of the fear of being accused of profiteering. A barrel of flour yields on an average of 290 one-pound loaves of bread. With an advance in the price of flour of \$2.90 and a 1c. advance in the price of bread, the baker is fully compensated for the increased cost of flour. However, with an advance in the price of flour anywhere from 50c. to a \$1.75, the baker usually absorbs this increase at a great disadvantage to himself.

"With a half-cent coin the baker could adjust his price of bread one-half cent per pound with an advance or a decrease in flour prices of \$1.00 to \$1.50 per barrel, which would offset the prevailing increase or decrease in flour prices and reflect itself to an equivalent amount in the retail or consumer price.

"Under the existing situation the baker is forced, in order to protect himself on a fair profit, to be a flour speculator, for he cannot adjust his bread prices as frequently as can other industries such as flour milling, sugar refining, coffee, etc. Flour mills can adjust their prices daily in accordance with the increase or decrease in the price of wheat. For every cent advance in wheat, flour is advanced 5c. The same thing is true with the sugar refiners. With a certain given number of points advance in the raw sugar market the price of refined sugar is adjusted, daily if necessary, to conform with the price of raw sugar. The flour miller and

sugar refiner, as well as many other industries can protect themselves on a reasonable profit irrespective of any fluctuations in the wheat or raw sugar markets and need not be at the mercy of speculation to be assured of a profit.

"Very frequently inharmonious relations existing between bakers in a given community is due to the fact that a group of bakers has been fortunate in making purchases on a low market when another group was purchasing on the current market.

"On the Pacific Coast we have a standard bread weight law regulating the size of bread to units of one pound and one and one-half pound loaves and in multiples thereof. With wheat at \$1.00 a bushel, taking into consideration freight and present operating costs, bread should wholesale at 8 cents per pound. With wheat at \$1.55 per bushel, bread should wholesale at 9 cents per pound.

"As an illustration, with a drop of the wheat price from \$1.55 a bushel to \$1.30 a bushel, the baker would still be compelled to sell bread at 9 cents a pound wholesale and be liable to accusation for profiteering. On the other hand, if the price of bread was reduced to 8c. a pound, he would be operating at a loss. But if the bread price is adjusted to 9c. on \$1.50 wheat and the market should advance to \$1.80 a bushel, the baker would still be compelled to sell bread at 9c. a pound wholesale, almost wiping out his profit.

"The average net profit to the baker on the basis of large volume is one-half cent per pound net. An advance in flour prices of about \$1.35 over his basic flour costs practically wipes out the baker's profit.

"Under existing conditions the baker is forced to be either a profiteer, a speculator, a philanthropist or a goat. We are in accord with a standard bread weight

law which protects the public against deception in the weight of bread. A close grain loaf may be heavier than an open grain loaf and from appearance, the average consumer would believe that the blown-up loaf contains more bread weight. Standardizing the weight of bread places all bakers on an equal basis in their dealings with the public and leaves the adjustment on the basis of price only, eliminating the evil of deception in the appearance of a loaf.

"The half-cent coin would bring about a more elastic medium of adjusting bread prices both from a standpoint of increase and decrease in the retail price as well as the wholesale price.

"Prior to 1915, the dealer generally sold all commodities in units of 5c., 10c., 15c., 20c., 25c., etc. The prices between the above denominations did not exist and cash registers prior to 1915 on the Pacific Coast were all in denominations of 5c. and 10c. and multiples thereof. The war brought the introduction of the prices between, such as 6c., 7c., 8c., etc., and it was necessary for the merchants to obtain new cash registers. Changing conditions may further warrant the half-cent denomination.

"Our recommendation for the half-cent denomination is based on the fact that it would enable the dealer to adjust his retail price in denominations of one-half cent along with the adjustment of wholesale prices of one-half cent and that it would place the baking industry on a sounder and more stable basis and to a great extent eliminate speculation.

"We believe this subject is worthy of the careful thought of every baker. Cannot American Institute of Baking direct the attention of the baking industry and of bread consumers to the advantage of a half-cent coin?"

Fundamentals in Business

*A Message from the University to the Business Man which
Outlines Basic Business Laws*

By ELMORE PETERSEN

This graphic sketch of the structure of modern business, drawn for the bakers of the Rocky Mountain States by Professor Petersen, Director of the Extension Division of the University of Colorado, is so well defined and the discussion of each of the units of the structure so simple and direct, that every baker may study it with profit.

In the advent of the baker into the business world the development of the distribution end of the industry has been much slower than the production end. Every successful and many unsuccessful bakers are good manufacturers. But often they are not good merchants.

Business today must combine both manufacturer and merchant. The Trade Promotion Department of American Institute of Baking recommends this discussion of business fundamentals to every baker. The basic laws it sets forth must be learned and applied before a continuing profit can be earned and a merited success attained.

AN INTELLIGENT analysis of the structure of business as we know it today reveals three definite units, the correct combination of which constitute the unified whole. These units are, (1) the individual himself; (2) the business; and, (3) the function or the result of business, usually called profit. It is the purpose of this discussion to single out each of these units for further analysis and study.

The Individual

It is trite to say that without the individual there could be no business. And yet many people fail to understand just how the value of an individual in a business may be determined.

In the first place, the value of an individual is determined by the amount of supervision which that individual requires. It is a profitless procedure to set a person to a task if it requires still another person to see that the first one does his work. I take it, that is why superintendents, managers and foremen are paid

higher salaries than the manual laborers whom they oversee.

Then again, the value of an individual is determined by the work he does minus his errors. There are many folks in the world who mistake motion for progress. Poking sand in a rat hole and making bricks without straw are both work of a kind not easy, but they can hardly be said to be profitable because the net result of the energy expended is without value. So also in a business office or store, because an individual does a great amount of work is no guarantee that his services are valuable. A vast deal of work full of errors may be rendered utterly worthless by reason of such mistakes alone. There are plenty of tragedies in business for which mistake-making has been the sole cause, and there are a host of persons who have remained in menial positions after long periods of service because of inaccuracies and discrepancies in the work they do.

The third measure of the value of an

individual is his personality. Stated in another way, the value of an individual is determined by his positive qualities minus his negative qualities. One has only to look about him to see how ruthlessly this law operates. Woodrow Wilson once observed that "Power consists in one's capacity to link his will with the purpose of others; to lead by reason, and a gift for co-operation." The qualities that make men big and that give them such power are many, but a few of them are so outstanding that they should be mentioned here.

High ideals is first and foremost. Unselfishness, honesty, self-respect and loyalty are all high ideals. These qualities are practicable and workable, and when made part of the daily occupation of an individual, yield generous dividends. Purposeful living is a positive quality of personality, without which an individual becomes a drifter as a ship without a helm.

And then there is enthusiasm, that "leaping lightning, not to be measured by the horse-power of the understanding," and courage, and sympathy and tact. All of these are positive qualities that are dynamic in the lives of men. When these are displaced or stifled by the presence of their opposites, the negative qualities, the individual is no longer a power, but becomes a plodder, a struggler, blaming his ill fate on luck, when as a matter of fact he, himself, is the master of his own destiny, the captain of his soul.

The Business

Having considered the individual, we now turn to the business itself. Business is essentially a process. It may be defined as an exchange of values for mutual profit. If we analyze this process, we shall find that it is made up of three distinct parts, namely, (1) plan, (2) action, and (3) control.

No business can be operated successfully unless there is first a definite plan of action in that business. Planning in business is simply setting goals and establishing objective. Sometimes these objectives may take the form of sales quotas, revenue, production totals, or other items. But whatever the objectives may be, planning is knowing where one is going in his business; what road he is going to take; and what he is going to do then.

Action follows planning. By action we mean that phase of the business which is commonly called "selling." Selling is a service-rendering activity. All good salespeople are quite aware that salesmanship is not a matter of unloading merchandise on customers, but that it is a process of helping the buyer buy. Herein is also included advertising, as well as all other means that may be employed in the selling of goods and services.

Planning and selling are not enough in a business establishment, there must also be control. Running a business, no matter how well planned or how efficiently operated from the standpoint of selling, without a definite control upon its operations, would be like attempting to drive an automobile without steering gear or brakes. And yet it is easy to find many concerns that have been wrecked in the ditch of business failures just because of the lack of control.

Control in business can only come through a system of adequate records. There is no business too little or too big that it does not need records of account. Control means the ability on the part of the manager or proprietor to analyze and to understand his business in whole or in part at any time. It involves a knowledge of costs of operation, mark-up, and margin of profit. It includes stock limits and budgeting of funds. It is brake, throttle and steering wheel, all in one.

Profit

If the intelligence and energy of the individual are correctly combined with the business, the return for this effort is called profit. Profit is the surplus that remains after all costs of operation and merchandising have been paid. It is that small surplus that may be saved out of every transaction, and having been saved, may be reinvested in the development and expansion of the business. Without that surplus and that saving, there can be no industrial growth, and it is only by means of industrial progress that a country can prosper.

What has just been said refers particularly to material profit—dollars. And while material profit is the first essential in every business, there are two other kinds of profit that are produced along with the dollars that are so necessary. The first of these is “reputation.” A business is known, often very largely, not only by its own reputation as such, but by the reputation of the individual or individuals who operate it. Reputation is the standing of an individual in his community. It matters much to the prosperity of the business whether the man who manages or owns it is a community builder, or not. Every person unconsciously and without effort reflects the character of his concern. We are continuously making reputations for our business. It is important, therefore, that such a reputation be an asset rather than a liability, and that the impression that is made on the public, our customers, is a good one.

More significant, perhaps, than the profit we call reputation, or the material surplus measured in dollars, is the other kind of profit that accrues, and which may be labeled “conscience.” There is no getting away from living with oneself. It matters very little if the dollars are piled high and if the reputation we gain

is flattering and to be envied, if, at the same time, our dealings are such that we dare not stand up before a full-length mirror and look the figure reflected there squarely in the eye. Our real reward for effort expended is a clear conscience.

The solution of the whole problem of business, then, depends for its solution upon the individual, his person and his personality, in contact and in relation to human affairs. Success is neither accidental, mysterious, nor a condition that can be measured in terms of material reward alone. It is said that the late Dr. Charles P. Steinmetz once defined success as follows: “To do the thing you like to do; to do it better each day, and in the doing thereof, realizing that you are thereby rendering a service to some one else—that is success.”

Our Daily Bread

IN the Sermon on the Mount occurs the most beautiful of prayers and in that prayer the appeal, “Give us this day our daily bread.”

Claim has been made that the bread of biblical times was a better foodstuff than the bread of today, and there has been much discussion as to the food value of “the staff of life.” Many fads and foibles have sprung up which hang their food philosophy on the character of the bread we eat. But bread remains as our principal foodstuff.

A study of food is of such paramount importance in hospital practice that it is interesting to know the real facts about bread as we eat it today.

The series of six articles beginning in this issue, in which Dr. R. H. Shaw, of the American Institute of Baking, discusses the food value of bread, is, we consider, a distinct contribution to our knowledge on the hospital diet.

—From *The Hospital Buyer*, May, 1925.

How to Choose Good Bread

Some Economic Leaders Teach Bread Buying Instead of Bread Baking

O TEMPORA, O mores! But a little while ago the teachers of House Economics taught home bread making and advised housewives to go to their own ovens for quality products. Now the leaders in the field of home economics recognize the baker's fine services and recommend his products.

Mrs. C. M. Johnson, Chairman, Department of Home Economics of the Congress of Women's Clubs of Western Pennsylvania has given discriminating housewives some excellent advice on the qualities which make good bread. In a bulletin published by and distributed with the compliments of her Congress of Women's Clubs, she says in part:

"Through all the ages bread, made from wheat, has been the staff of life. No food or combination of foods can take its place. The bountiful table of the rich is incomplete without it and the poor depend upon it for their subsistence.

The quality of bread is of vital importance to more persons than is the quality of any other food to the human race.

It is a far cry from the primitive woman who ground her wheat between two stones and made it into a little cake, to the woman of today who goes to the grocery and buys a fresh loaf of bread ready to eat. During that time the manufacture of bread has undergone many changes.

The breads on the market today are of every grade imaginable. Much is of so high a quality that few housewives can equal it, week after week, in the varying temperature and other conditions of the home kitchen. On the other hand, there is a great deal of bread sold which, as a staff of life, is a poor, wobbly

reed. The grocer carries both good bread and bad.

The poor quality loaf is there because there are so many women who, not being good judges of bread, deliberately choose a poor loaf instead of the better bread to be bought at the same price.

How to Know a Good Loaf from a Poor One

First, weight for weight, it is not over large—beware the big loaf that looks as though you were receiving more for your money. It is only more gas you receive; in actual bread you receive less.

Choose the loaf that will regain its shape after pressure. The best bread will always "come back." If your bread does not it will be a soggy mass in your stomach, and you will need to buy a little better bread.

Buy the loaf that is well baked. A pale underdone loaf is not good. A good brown crusted loaf is best. But by brown I do not mean black. The shade of brown tells the wise what is on the inside of the crust. The more the brown shades toward a golden brown, the richer and more wholesome are the contents. The farther away it shades from the brown toward the blackish tones the poorer the quality.

Beware of the crumbly loaf that does not cut clean. One of the best tests of good bread is the kind of toast it makes. A loaf that cuts clean and smooth and toasts to the golden brown shade is a worth-while loaf.

If you do not buy good bread, it is your own fault. If you do not know good bread, keep this folder handy until you are sure you can buy for your family the best there is. Buy bread that is really the "staff of life."

Keep Away from Food Fads

Common Sense Plus Scientific Research Should Determine Eating Habits

By WALTER H. EDDY*

Professor Physiological Chemistry, Teachers College, Columbia University

ONE point we must bear in mind in selecting food materials, and that is to keep away from fads. I have no patience with them.

Here are my tests for an efficient food:

First, it must have caloric value, because we cannot run a machine, even the bodily machine, without energy. Second, it must have certain nutritive elements: proteins, fats, carbohydrates, mineral salts and water. Third, it must have proteins of a certain quality, so that the protein ration may be complete.

Then the efficient food must have certain accessory factors, the vitamins A, B, C, D, E and X. Finally it must have digestibility. At this point most nutrition experts stop, but I go one step further and add palatability. I have always contended that a good cook, properly directed, can do more in the way of reforming nutrition than any one else.

In other words, if I can make a bread that is palatable and that is at the same time meeting the various tests outlined in the preceding paragraph, then there is little need for extensive advertising. I simply feed my public and they eat. But if I make a bread that is unpalatable I may waste large sums of money in advertising the product to get it across.

There are certain persons who become narrow in their use of the dietary taboo. Taking white bread as an example, we know that to the whole wheat faddist white bread is anathema. Let us see if there is any ground for this. Is white bread an efficient source of energy? Its caloric content is high. Are its proteins

complete? Not at all, but stop for a moment. Are oranges complete in all food factors? No, they merely possess some of these. Are they complete so far as mineral salts are concerned? Far from it and yet who ever heard of any one refusing to eat an orange because it is unwholesome? That it has its place is generally conceded.

So, to return to white bread; even when made with water it has all the calories of energy that any one food is expected to furnish in the average dietary. It has a fair proportion of protein, fat, carbohydrate, and mineral salts, although there is a deficiency of calcium.

As to protein-quality, white bread is deficient in lysin. Finally, vitamins A and B are present in very small quantities.

The whole indictment, then, against white bread is that it lacks protein-quality, calcium and certain of the vitamins. Is it not common sense, when we consider all the qualities of which white bread is possessed, to select other articles of diet that will make good its deficiencies? For surely no one would wish to make an entire meal from bread alone, whether white or whole grain.

The foods which will be good accompaniments are beef steak, which makes good the protein deficiency, and milk, which furnishes the needed calcium, the missing vitamins and still more protein-quality.

Suppose, on the other hand, that some one has resolved to eat only whole wheat bread: that he has decided that white bread is taboo. When then? Does he realize that in order to get the full lime

*From address before Am. Food Jour. Inst.

requirements from whole wheat bread alone he would have to eat about five pounds?

In making good the protein lack one might add peanut flour muffins, or rolls made from soy bean flour, and there are any number of other possibilities in this connection.

Going back for the moment to the taboo: mince pie is one of the most glorious creations of nature, or of human development. Some one has called it "a carbohydrate of high caloric efficiency." That is a good definition from the nutrition standpoint, but no one can eat a whole mince pie on top of a beefsteak and high protein dietary without suffering.

Recently at Teachers College we completed some experiments with white rats to determine just how much a commercial bread lacked in salt quality, in protein-quality, and in vitamins, and these results are on record for those who are interested.

The Use of Whole Milk in Bread Making

We went further with our experiments. One of the baker's chief difficulties is in the use of whole milk. He does not object to the cost, but he does find the variability a real problem. The raising of bread dough is determined, as we say in the laboratory, by the hydrogen ion concentration. In general terms, this means that the yeast will grow only under certain conditions of acidity or alkalinity. If this is interfered with, the growth of the yeast is slowed down, the gas production is lowered, and the bread fails to rise on time.

Now fresh milk bought in quantity changes in acidity from hour to hour. This does not mean that it is sour milk, but merely that slight changes in the acidity have taken place. In a large city most of the daily milk supply is from two to four days old, and each lot differs from the others. So the baker loses much

time while the men are standing about waiting for the dough to rise.

In our experiments we established some interesting facts for the benefit of bakers who are struggling with these and similar problems; and these, too, are on record for those who are interested. We are not claiming that the baker should try to make bread that is in itself a complete food. We do maintain that we are ready to help the baker improve his white bread so as to make up its lime shortage, its incomplete proteins, and its vitamin lack. This will mean that he can actually give us a better white bread.

Place for Whole Wheat Bread

There is a place for whole wheat bread. It is a stimulation against constipation, but even here it is well to be cautious. Many persons find that overstimulation may bring on diarrheal conditions that result in a loss of practically all food eaten. Common sense must govern.

Let us supplement when we need to, using one tool to accomplish one thing, another tool for another result. When we wish the children to exercise their teeth let us give them whole wheat bread and coarse meals for chewability, by all means, but let us not go out and tell every one that he must do the same thing!

The American Institute of Baking is working along these same lines and they have shown interest in our results. After the war our wheat supply backed up in the United States, so the bakers are engaged in extensive selling campaigns. We are willing to "eat more bread" if they will continue to improve the quality, and here is where the laboratory comes into the story.

The American Institute of Baking, the National Canners' Association, the Institute of American Meat Packers, and other large organizations are leaders and their representatives head their sections in the scientific societies.

Books for the Baking Laboratory

NUTRITION OF MOTHER AND CHILD. By C. Ulysses Moore, M. D. M. Sc. (Ped.) 33. figs. 234 pp. J. B. Lippincott Co., Philadelphia and London, 1924.

The general observance of May Day as Child Health Day has crystallized as never before our interest in the nutrition of children. With the rapid development of scientific interest in the still little understood problems of metabolism and nutrition, it has been possible to assemble a few definite facts as to the types of foods essential to proper nutrition.

In *Nutrition of Mother and Child*, Dr. Moore has brought together much of this newer knowledge. He has drawn liberally upon the discoveries of Hess, McCollum and Mellanby and he has supplemented the reports of other investigators by the results of his own experimental work. As the preface sets out, the volume is not intended to replace the physician. Sick children are but casually considered. The purpose of the book is to teach mothers how to establish sound health by proper feeding and care.

Dr. Edward T. Devine in a foreword happily discusses three vitamins which are essential in the mental diet of mothers, social workers and nurses. These vitamins are scientific temper, common sense of realities derived from specialized training and experience. These new vitamins may well be made a part of the diet of every writer on nutritional topics. If the vitamin of common sense were more generally included in the ration of writers and lecturers on food topics, food faddists would subside and food fads be forgotten. It is a difficult thing, however, for both talkers and writers to replace pat phrases often popularly though wrongly recognized as facts by the latest scientific information when the acceptance of such data disturbs old notions and interprets the easy flow of trite advice.

Dr. Moore in his otherwise excellent book lays himself open to serious criticism because of his inaccurate and misleading references to white bread. Like other popular writers, he finds white bread disease producing on the strength of early reports of nutritional experiments which showed that mice fed on a diet of white flour and water come to an early death. Through some strange logic the author reaches the conclusion that this must be due to the fact that there is something wrong about white bread. He does not stop to

consider that white mice fed on any other restricted diet, even such excellent foods as butter, apples or cabbage, would die even more quickly than when fed on flour. Furthermore, a more careful investigation of the literature by the author would show that whole wheat flour, although often spoken of as a complete food, is far from complete and that its use, unsupplemented by other food essentials, produces starvation and death.

The author has carried his erroneous ideas of the relative nutritive value of whole wheat and white bread into his menus. It is to be hoped that if other editions are published, the constant references in the menus to whole wheat and Graham bread will be changed, substituting the words "bread" or "milk bread," thus bringing his menus up to date with the latest investigations of the Mellanbys, McCollum and Roscoe Hart Shaw.

In discussing meals for children, the author says, "The child usually is hungry after school, but he should be discouraged in his desire to eat upon reaching home." Such advice is not compatible with Nature's laws for the feeding of her children or with the latest conclusions of the pediatricians who, knowing the splendid improvement in child health which has followed mid-morning feeding in the form of the school lunch, would introduce a fourth meal into the diet of the growing child and preferably make this meal some simple food such as a sandwich, high in energy value.

The old taboo against between meal feeding, which undoubtedly originated in the desire of the mother to keep her children out of the kitchen, is fast disappearing and hungry children are not compelled to go hungry because Nature's demand for food brings hunger pangs at 3:00 P. M. instead of 6:00 P. M. We can take no exception to the advice that children should be carefully guided in their choice of lunches and their desires turned away from dill pickles, candy and peanuts toward soups and sandwiches.

If the author's work is used with a full recognition of these lapses from sound science, it will be interesting and helpful. But if, as is so often the case, it is used by those who cannot discriminate between scientific facts and ancient taboos, this book, with its misinformation, will delay the acceptance of modern nutritional advice.

H. E. B.

Abstracts of Technical Articles

Selected for Baking Technology from Chemical Abstracts

Experimental study of brown and white bread in the diet of the rat. G. A. Hartwell. Biochem. J. 18, 1323-6 (1924).—The rate of growth of young rats on a diet of bread (white or brown), butter and salt mixt. is slow. Male rats grow more rapidly on brown bread than on white. Female rats grow equally slow on either kind of bread. For gestation and lactation, brown and white bread appear to be equal. With both diets the litters are of poor weight at birth, and only a few young are weaned.

Benjamin Darrow.

Iodine in nutrition; goiter as a nutritional problem. H. C. Sherman, et al. Am. J. Public Health, 14, 1038-42 (1924).—In experiments by Sherman white rats have thrived for 14 generations on wheat, milk, highly refined salt and distilled water. As rats need Iodine and a storage could hardly be carried over 14 generations, it is evident that this low Iodine diet with no sea foods must have furnished Iodine in requisite amounts whether such amounts could be detected analytically or not. It appears probable that milk and green vegetables will prove of value as dietary sources of Iodine. The future will not improbably reveal other nutritional benefits to be derived from an understanding of the distribution of Iodine in foods and its nutritional function, in addition to the prevention of simple goiter.

H. B. L.

The story of bread. W. W. Skinner. Am. Food Jour. 19, 564-8 (1924).—This paper is based on an address delivered at the recent convention of the American Institute of Baking and is in answer to the question "What is the Bureau of Chemistry doing for the baking industry?"

J. A. Kennedy.

Bread consumed by Greek soldier prisoners in Asia Minor. T. Karantassis. J. Pharm. chem. 30, 313-5 (1924).—A sample of prison-bread which had caused the death of many soldiers contained the starches of darnel (*Lolium temulentum*) and of sorghum vulgare, also particles of straw, sand and clay. Its composition was H₂O 11.5, protein 7.28, fat 1.75, starches 60.82, fiber 9.50, ash 9.85%; Cl in ash, traces. The starch grains were nearly unchanged owing to imperfect baking.

S. Waldbott.

Determination of moisture in wheat flour. G. C. Spencer. J. Assoc. Official Agr. Chem. 8, 301-11 (1925).—Extensive tests indicate that determination of H₂O in flour by drying in hydrogen, in an air oven, or in a vacuum oven by the usual procedure, is not satisfactory. The advantage of using loosely covered dishes in vacuum drying is demonstrated (cf. Mitchell and Alfend, C. A. 18,3235). The degree of vacuum used in drying affects the results. The following is proposed as a standard method for umpire work: weigh accurately about 2 gram sample in a tared, covered dish, loosen cover, heat at 98-100° for 5 hours at a pressure of not more than 25 millimeter of mercury, tighten the cover, cool 20 minutes in a desiccator and weigh. It is claimed that the method, though it does not necessarily show the actual amount of H₂O, gives a closer approximation than any other practical method. For rapid work, and when no vacuum oven is available, the following is recommended: weigh accurately about 2 gram sample in a tared, covered dish, remove the cover, heat in an air oven at 130° for 1 hour, replace the cover, cool in a desiccator for 20 minutes. The method gives practically the same results as the vacuum method. Both methods gave good results in collaborative work.

A. Papineau-Couture.

Drying of flour—its hygroscopic properties.

E. R. Smith and L. C. Mitchell. Ind. Eng. Chem. 17, 180-3 (1925).—Flour dried in vacuum in loosely covered dishes gives uniformly greater percentages of loss in weight than when dried in open dishes or when dried at atmospheric pressure in either open or covered or open dishes. Drying at atmospheric pressure in covered dishes gives erratic results because the covers retard evaporation. The water-oven method with open dishes gives considerable variations in both duplicate and check duplicate determinations, which indicates that this method is both inaccurate and unreliable. The property of flour of losing or gaining weight when exposed to the atmosphere of the laboratory shows that special precautions must be taken to prevent any change in weight when weighing the samples. The ordinary desiccator, with anhydrous CaCl₂ as the dehydrating agent, is of little, if any, value in preventing dried exposed flour from increasing in weight during the period of cooling.

L. W. Riggs.

New Equipment Aids School

By WILLIAM WALMSLEY

THE courses of the School of Baking have been developed through the process of steady growth. No training which so combines the work of the class room with actual shop practice can be perfected except by building each new course out of the experiences and with the materials gathered from year to year. The great value of the course in the School of Baking rests upon the direct application of class room instruction to bake shop practice. The student first applies class room instruction in the experimental bakery and later tries out his new knowledge in the operation of a fully equipped bakery.

The rotation of students through the various divisions of the work is made possible by dividing the classes into groups of twelve men each. These small groups so handle the shop schedules that each student in his turn is responsible for every operation. The student who is assigned to mix the doughs does not make them up, proof and bake them the same day, this being accomplished by others, but by using a rotating schedule, the day comes when this same student has to work on the oven. Every shop day he has a new job assignment, and this continues until the entire shop operations have been completed, after which the schedule is again repeated. This system of teaching through actual production will now be supplemented by a new course in which the student will not only mix doughs but carry the entire operation of preparing and baking a dough through in a single day. Such a course, supplementing as it does the present course, fits well into the broad gap between experimental baking and shop production. The new laboratory will make it possible to accomplish essential results:

By providing a means by which each student works with more individual doughs.

By creating confidence as to his ability.

By providing a laboratory in which the special students may carry on work without interfering with regular shop schedules.

By providing a laboratory equipped for conducting research investigations under actual commercial bakery conditions.

The new experimental bakery is equipped as follows:

- 1 bbl. Century Mixer.
- 1 80 qt. Century Cake Mixer.
- 1 Schroeder Work Bench.
- 1 Set of Toledo Spring Scales.
- 1 Set of Smith's Accurate Scales.
- 2 4 ft. Dean Sanitary Dough Troughs.
- 1 Peerless Merry-Go-Round Proofer.
- 1 Champion Loaf Moulder.
- 1 Dean Proof Box, electrically heated and specially constructed for controlling the relative humidity.
- 1 Edison Electric 2 Deck oven, 120 loaves capacity (60 loaves per deck) equipped with steam and automatic heat regulator.

And all the miscellaneous equipment necessary to operate a bakery.

In addition to the equipment in the new experimental bakery the equipment of the School Bakery has recently been extended and improved by the installation of

- 1 New Fosdyke Oven.
- 1 Peerless Loaf Moulder.
- 1 Champion Dough Break.

A new high speed mixer, made by the Day Machinery Co., has been shipped to the Institute and will shortly be in operation.

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Fused for Helpful Effort

THESE are days of joined forces. So fully has the idea that success may be grasped by individual effort been succeeded by the broader belief that joint effort is more productive, both for the individual and for industry, that today is recognized as the age of cooperation.

In Washington last month the business men of America gathered for their annual conference. They met in the new home of the United States Chamber of Commerce, a home built at Washington on Lafayette Square, facing the White House, in order that in its conference rooms and laboratories industry might better serve the gov-

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ernment which protects and fosters it, and the people who enjoy prosperity and happiness because of it. No greater evidence of the new role cooperation is playing in the development of our country will ever be given than will be set down in the record of that week of constructive work.

At the dedication of its building the members of the Chamber heard William Howard Taft tell how he as Presi-

dent of the United States conceived the plan of bringing men of affairs in industry to help him, the head of our Government. And Charles Nagel, Secretary of Commerce and Labor in the cabinet of Presi-

dent Taft, told of his efforts to organize industry and of the way in which with unerring vision the builders of the United States Chamber of Commerce planned and erected a permanent home in the nation's capital.

Every baker may well study the report of that great conference for in it he will find a truer appraisal of his value as a business man to his community and his country than will ever come to him busied with the routine of the day's work. And he will see the clearer a place for him in his local organization of business men where he will have a real part in the doing of constructive work for his city and his industry.

Cooperation is but the getting together of individual minds and the setting of those minds to work for a common purpose. American industry leads the world, not so much because our workmen are more successful or our capital more resourceful as because our common purpose to build to success is better defined. Our industries are not satisfied merely to continue their existence. The business man who cannot plot month by month and year by year a steadily ascending curve knows that the day will come when the business represented by that curve will leave its level of complacency and drop to ultimate extinction.

The baking industry may well study its curve. Its trend has not been as steadily upward as it should have been. It has been too full of dips and periods of low levels, and the reasons for these stagnation periods have too often been assigned to unsatisfactory competitive conditions, to bad trade practices, to lack of sound advertising and sales methods, when a more critical study would show the real reason to be the inertia and lack of constructive purpose of the industry itself. How can any baker or miller expect to see his business grow just because his products

are meritorious? How can any industry demand a larger appreciation of the value of its services because a few of its units are helpful and progressive?

The Retail Bakers of America have just held their annual convention. It was a splendid meeting. The subjects discussed were fundamentally important to every retail baker. The resolutions adopted bear promise of rich fruit, and yet 90% of our 30,000 retail bakers knew nothing of the convention and will never hear of its work.

In September a group of the larger units of the baking industry will gather at Buffalo. American Bakers Association will bring together the leaders in American thought. Our Government will send its cabinet officers to discuss the work of their departments. Our scientific societies will send their spokesmen to tell our industry and our customers what the physician and the dentist desires of us. Every branch of the baking industry will send its ablest men to the conferences. And yet the baking industry will not be at Buffalo. The most of it will stay at home and continue to work in the shop, smugly satisfied that conventions are without profit for them. The real meaning of cooperation has never reached them. The phrase, "our organized industry" strikes their ear like a tinkling cymbal to be faintly heard and immediately forgotten.

About 3,000 bakers vision the opportunity they have of working with their fellowmen to build for the industry places of high honor in society and in commerce. Can this group, 3,000 strong, bring the 30,000 individualistic bakers to their aid?

Two things are necessary for a successful campaign of armies or of organizations. The first great need is a common purpose behind which to rally every unit. The second is strong leadership with abil-

ity to plan and force to execute. No industry has a greater purpose than ours. No man is a more essential servant than the baker and no field for conquest is so rich as that which lies before us.

The little successes which have come to the baker have given him unwarranted ideas of his accomplishments. He has looked upon the narrow field he has successfully occupied as if it were the whole country. He has seen the housewives he serves cut baking day from their calendar and he has thought that all housewives were doing the same thing. He has believed that the products of all bakers were superior to other foods because he has measured the output of the industry as a whole against the high quality of his own service. And because his curve of progress has been upward he has assumed that the curve of the industry as a whole has been equally satisfactory.

Our convention at Buffalo will bring together every constructive agency which sees for the miller, the baker and the allied tradesman a common purpose to increase the consumption of cereal products and so better to nourish our great family. In that convention will the leadership be developed and the organizations perfected with which to achieve that purpose. The convention of 1925 will be epochal in its accomplishments. The men of the baking industry who do not give one week of their year's work to the convention will not only miss the opportunity of participating in a great movement but they will fail to achieve for themselves the benefits which can come only from well planned conferences and common understanding.

American business has built its home in Washington. The baking industry is erecting its capital at Chicago. American Institute of Baking and American Bakers Association confidently looks to the Buffalo convention to build a still greater organization for the carrying on of its most important work.

Women's Viewpoints

In approaching the woman on the subject of bakers' bread we have found four successful avenues of appeal:

1. Labor savings. The majority of women know home-made bread as backache bread and are glad to have a rest from it. They want to believe in bakers' bread, and are not unduly skeptical about it.

2. True Economy. When we explain to a woman that she has a right to count her time as worth something—as worth \$30, \$60, \$100 or \$150 per month—she does not wish to argue back that home baking is cheaper, basing her assertion on the cost of raw materials alone. Most women in the home these days count their time as worth what they could be earning in a business position. They want to see their time evaluated in estimating the cost of the home-made loaf.

3. Cleanliness. The baker must back up his products by selling his own plant to its own customers. The plant that has visitors' days all week long is the plant that wins approval. Without cleanliness being sold to the consumer it is just as well not to try to sell the other factors.

4. Wholesomeness. Cleanliness being sold, along with true economy, labor saving, and a quality product, the test of a bread's wholesomeness remains.

If there is not flavor and taste in your bread, no amount of selling force will put it over for you. "I don't like the taste as well as that of my home-made bread," is the final argument of many a woman who has refused to consider baker's bread.

—Agnes White, of Washburn Crosby Co.

"I want to thank you for the material you gave me for my address to our civic organizations. I never could have made it as successful without your help."

—C. A. Bradley, Perry, Iowa.

Bread

By E. V. McCOLLUM

*Department of Chemical Hygiene, School of Hygiene and Public Health,
The Johns Hopkins University*

ONE of the most difficult ideas to impress upon the public mind in connection with the teaching of the facts brought out by modern investigations in nutrition relates to bread. When one talks to a general audience about nutrition one of the things which is necessary is to describe the quality of the more common and more important of our natural foods. In doing this one must point out the fact that all cereal grains, tubers, fleshy root vegetables, meats, and sugar, have one or more deficiencies, that is, they do not furnish sufficient amounts of one or another of the nutrient principles which are essential for the support of satisfactory nutrition either during growth or for maintenance in adult life. Naturally the public is much interested in the kind of bread which it should use. Before the formulation of modern views concerning quality in foods and the nutritive requirements of the body, many seekers after relief from indigestion or ill health from other causes had turned toward whole wheat bread for salvation. White bread has been often maligned as unfit for human food, and when investigators record their findings that bolted wheat flour is more deficient as a foodstuff than is whole wheat flour from which it is made, they appear at first thought to support the view that whole wheat bread would be more wholesome than white bread.

Since 1918 I have repeatedly emphasized the fallacy of this reasoning. We have many things to consider in respect to the nation's food supply, and one of the most important is the bread problem. I have continually emphasized the fact that successful nutrition will be deter-

mined by a proper choice of foods. This means that our ordinary natural foods or manufactured foods, although individually incomplete from a nutritional standpoint, are nevertheless wholesome components of a well-planned dietary. The importance of proper selection of articles for the daily menu rests in the fact that certain foods when taken at the same time or during the same day tend to make good each other's deficiencies, and so enhance each other's nutritive qualities.

All of the authorities on the milling industry with whom I have discussed the problem agree that it is not now feasible to attempt to market whole wheat flour for a nation as populous as our own, and with the distribution of population which we have. Wheat is grown far from the centers of population and there are good reasons why the milling industry grew up in the middle west, and why it should continue to be located at some distance from the great cities and fairly dense rural population in the eastern section of the country. The problem in flour is in great measure one of distribution. White flour keeps much better than whole wheat flour and so can be handled with less commercial hazard. The American public likes a white flour bread and I do not see any reason why this taste should be disturbed. The important thing is to insist upon the consumption of a sufficient amount of what I have termed the "protective foods"—milk and vegetables of the leafy type—to insure that the calcium deficiency and the vitamin deficiencies of white wheat bread will be made good.

The baking industry is taking steps toward solving the white bread problem by conducting research on bread making,

with a view to incorporating larger amounts of milk solids in the loaf than was formerly the case, and this is a step in the right direction.

It is thoroughly established that perhaps the first in importance among dietary defects of the typical American diet, which may appropriately be described as one consisting of white bread, meats of the muscle type, potatoes and sugar, is its lack of calcium. Wheat does not furnish a sufficient amount of this to make it exercise any great protective influence when taken along with other calcium-poor foods, and the only foods we have which are rich in calcium are milk and the leaves of plants.

It should be emphasized that modern investigations on wheat and wheat flours demonstrate just as clearly the fact that whole wheat is not a complete food as they do that white flour is in itself less complete as a food than is whole wheat. If one were reduced to conditions approximating those prevailing in famines and had the choice of attempting to subsist over a period of weeks or months upon one or the other he would do well to select whole wheat instead of white flour bread, but this situation fortunately we do not need to consider. One would make an even greater mistake by trying to live upon whole wheat bread with a diet, the other components of which were not fortunately selected so as to make good its deficiencies than he would if his bread is made from white flour but combined with the protective foods in appropriate proportions.

Those Unwelcome Blisters

Have you ever been made angry by blisters on the crust of your baked product? There are five items to check if you have such trouble. The first is the item of salt. Insufficient salt will result in blisters and this is the worst cause of all,

for insufficient salt means inadequate flavor. Too young a dough will result in blisters, also, as will excessive steam in the proof box, steam condensation in the oven, and loose moulding. Of all these causes the lack of salt is the one that most quickly runs into loss of sales.

Opportunity not Drudgery

"The women of our time are right in resenting their restriction to the primitive activities of the kitchen and nursery. It is the work of mothers to feed their children and it is a disgrace to motherhood that they allow so many children to grow up ill fed.

"The business of women is to make better people through a far higher standard of breeding, of environment, of education. No nobler task can be imagined than the upbuilding of a nobler race."

—Wash Tubs and Women's Duty,
Charlotte Perkins Gilman,
Century Magazine, June, 1925.

The Toastmaster

"The Profitable Art of Serving Toast and Toasted Sandwiches" is the title of a most attractive booklet published by the Waters-Genter Company as a service book for their new "Toastmaster" toaster.

This booklet contains many suggestions and recipes for the favorite American toasted luncheon sandwiches which are filling our new sandwich shops to capacity at meal times. The toasted cheese sandwich which makes us hungry as we pass the Kraft Cheese Company's billboards is featured in colors.

For the baker who is developing his restaurant business this combination of sound sales talks and trade tested recipes furnishes a valuable means for friendly service. It should be placed in the hand of every restaurant owner and chef in town. Bakers can secure copies from the Waters-Genter Company, Minneapolis, Minn.

BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

H. E. BARNARD, Editor

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JUNE 15, 1925

We Work Together

To win through knowing our markets and developing their full potential possibilities, a higher place for the baking industry in the great family of America's business life.

On—On to Buffalo

WHEN we meet at Buffalo at our annual convention, we shall, I hope, find time to check up our work and plan constructively for the year ahead. Our conventions should bring us to the apex of our efforts to build a greater industry. Surely the splendid progress we have made in the past few years is worthy of a celebration, so let's make our convention at Buffalo not only an opportunity in which to learn of plans for the future but an occasion for congratulations.

In planning our program, my idea is to fill it so full of interesting addresses and important and helpful conferences that no member of the baking industry will leave Buffalo without taking home some inspiration which will make him a better baker and so a better servant of society. With this thought in mind, we are setting aside Monday as a play day, a day in which old

friends may get together and new acquaintances formed, but every day after Monday will be a work day filled in every hour with opportunities for study and conference. The convention programs will occupy the mornings; conferences of special interest to every branch of the baking industry the afternoons. And the evenings will be filled with entertainment, with dinner conferences, with opportunities for continuing technical discussions.

Never before has it been possible to organize an international exposition of the baking industry. We shall do this at Buffalo and in the great Armory the Bakery Equipment Manufacturers Association will assemble for our benefit every machine device used in the manufacture of bakery products. And joining with them are the men who supply the bakers' materials, from flour and yeast, milk and raisins, to the spices and condiments and every commodity which in any way makes products of the highest quality and has a part in placing them on the table.

Our convention at Buffalo will then be a melting pot into which we shall throw all of the experience of past years, all of our ideas for developing a more successful business, all of our hopes for better serving our customers, and out of that melting pot we shall take the plan of our future work, fused from the contribution of every member of our industry, and freed from the dross of ignorance, of self-complacency and littleness, and with it we shall build our greater industry.

Our convention of American Bakers Association is the conference of every baker and of every man who is interested in the better nutrition of the race. With great hopes and confidence I urge you to make your motive for the months ahead our new slogan, "On—On to Buffalo."

LEWIS F. BOLSER,

President.

All Breads Are Good

WHEN the fogs lift and we are able to judge the values of white bread and the whole wheat breads with a clearer vision than that given us in these days of assertion and denial, we shall find no nutritional battle ground strewn with the victims of the conflict. Rather we shall see bread in its every form as an entirely satisfactory food, meeting in variety of taste and appearance every desire of the consumer. For there is no real issue as to the food value of breads. They vary in composition with the formulas used in making them. The whole wheat breads contain valuable mineral salts, some vitamins and crude fiber which makes them desirable foods for those who cannot otherwise balance their ration to include these food essentials.

Bread made from flour, salt, yeast and water is an energy food of greatest value, but it is an incomplete food, as most foods are, and it must be supplemented at the table with milk, and the roughage found in leafy and fibrous vegetables. If, as is now generally the case, white bread is made with milk, it has no mineral or protein deficiency and except for its low content of indigestible material which is helpful to that small group of constipated individuals, is nutritionally to be preferred to whole wheat bread.

The fruit breads add variety and satisfy the need of flavory and attractive food. They are not greatly different in composition from other forms of bread, but they are a valuable addition to the long list of desirable breads.

Every type of bread, from the coarsest whole wheat or graham bread to the loaf baked from the most highly refined flour, furnishes the body with energy foods in an acceptable and desirable form. That is, of course, the purpose of bread. It is not designed to supply fat. That is avail-

able in other foods in more concentrated form. It is not a vitamin carrier. The vitamins are abundantly present in leafy vegetables and dairy products. It is not essentially the mineral source, for lime is available in excess of the body's needs in milk and every food except sugar adds its complement of minerals to the diet.

The baker manufactures bread. That is his chief product. He produces those forms of bread his customers want. He is no more responsible for their choice than any other maker of essential commodities. He is quite as happy in feeding the human family whole wheat bread or raisin bread as when his whole baking is white bread. He is not interested in theoretical and fine drawn discussions over the relative mineral or vitamin, or protein, or crude fiber content of types of breads. He knows that all kinds are good, that he is making a basic food around which a full and well balanced diet is easily built up. And his concern in the long drawn out controversy between whole wheat bread and white bread lies only in the telling of proven facts instead of theories and in the correct interpretation of the great store of facts about breads which is now available. He is no opponent of whole wheat bread. He appreciates its great merits. He only deplores the constant agitation over bread virtues which seemingly is never ending and which so often becomes an obsession with the proponents of special breads. He would welcome the joining of all of the interests in all forms of bread in establishing beyond the reach of criticism the fact that all breads made from wholesome materials are the best of our foods. He would lead in the effort to increase the consumption of every form of bread and at the same time to stress the necessity for a balanced diet in which bread would be the basic but in no sense the complete food.

Apologizing for Ourselves

WE were reminded the other day that we had been apologizing rather often of late for a very bad habit. The representative of a national business organization was telling of his experiences with bakers and their correspondence. Some fifteen hundred plants, large and small, were using his appliance. Changes in its design were to be made in order to increase its time and labor saving value. His company wanted to learn how satisfactory the present installations were and secure the opinions and advice of his customers. A letter sent to each from the main office brought seventeen replies. But one of each hundred users took the trouble to reply at all.

When we failed to show surprise, this gentleman went on with the story. When it became apparent that the other bakers had no intention of answering, instructions were sent to all sales representatives to call on the bakers in their territory and secure the information first hand. In most instances they were received with courtesy, and given the information requested. But the cost was several hundred dollars more in time and salaries than it should have been. Even our caller had travelled through five states for two months on the job.

And so again an apology was made for the baking industry, an explanation to our guest that this was the same old story, as told by the representatives of every organization which deals with bakers.

While it may be more satisfactory to require personal contact in all business dealings, American business competition is too keen to disregard with impunity the personal communication, and certainly too expensive.

When correspondence is neglected, opportunities are overlooked and the product represented must increase in price in proportion to the time and salary of those who

must personally represent the organization.

An industry which has sprung from the hand craft and bench work to a billion dollar giant in two decades is sufficient excuse for some shortcomings, but why the industry's blind spot should be concentrated on the side of such a simple but essential business courtesy is hard to explain.

The Institute has been watching closely the slow improvement in attention to correspondence for five years, ashamed to admit that the reputation of its Association members among other industries was nationally known for disregard of business correspondence.

It is taken for granted that important bulletins or requests for information which in themselves entail no obligation but would be of real value to the whole industry will bring a reply from only six out of every one hundred bakers receiving them. Some day it may be permitted to know what sort of mental inhibition prevents the other 94% from writing a word or two.

Our psychologist friend would tell us that it is an inferiority or fear complex hang-over from the bucket system days of baking history. And the psychoanalyst tells us to drag our secret fears out in the open if we would kill them with laughter. Therefore, a little honest confession on the subject of this slovenly mental habit may help to take care of the day's mail more promptly.

Here is an excerpt from the letter of an allied tradesman who supplies raw material to a considerable number of bakers.

"Perhaps you do not realize it, but the vast majority of bakers (not the small ones alone) do not answer their correspondence—pay absolutely no attention to mail or even wire quotations. One test I have in mind was a list of fifteen large bakers. A mill wired this list religiously on each change in the market for a number of weeks and not one of the list even thanked the mill for this service.

Another case—a list of over two hundred bakers were sent a weekly market letter covering quite a period of time—number of replies—not one.

This practice is not conducive toward building good will and a 'stick-together spirit.'

The time may come when the baker will need the miller's influence more than he does today.

Some of the larger bakers sometimes send out a circular letter or wires asking questions, and neither buy nor answer quotations after requesting them.

Their explanation might possibly be 'Busy'—they are no busier than other business men and should be taught what business ethics are. I know of no source better able to get this idea over than the A. I. B. and B. T." This is caustic criticism. Is it justified?

More Cooperation

IT IS not always easy to see a direct relationship between the Wisconsin farmer and the baker in Boston or Mobile. It does exist, however, and it is rapidly becoming more important as more and more milk is poured into bread formulas.

The greatest of all wastes of human food is the wasted skim milk which in river-like volume flows away from the thousands of creameries and skimming stations, which take off the butter fat and throw away the equally valuable milk proteins, sugars, acids, minerals and vitamins. This by-product of the dairy is now being concentrated by drying and in the form of dry skim milk is furnishing bakers with their best bread ingredient next to flour itself.

And the dry milk interests have now organized the American Dry Milk Institute and joined in a common effort to promote the use of more milk in bread under the skillful leadership of Dr. H. E. Van Norman, president of the World's Dairy Con-

gress Association. The greatest single market for dry milk is the bakery. This new organization will give the baker much help in his efforts to build a more nutritious loaf and to secure the public acceptance of the virtues of bread made with milk.

Piecrust and Pie

IT IS hot, hard work baking pies for hungry children. Children haunt the kitchen on baking day. Or if mother has abolished baking day, just as she has passed the drudgery of wash day to the laundry and given the electric light company her old job of cleaning and filling the lamps, she remembers her own childhood in the days before baker's pies were just as good as mother made. And perhaps, too, as she recalls the impatient yet loving "Do keep out of my way, Mary, or I'll never get these pies out of the oven," she understands better than then why her mother taught her that too much pie wasn't good for children. Of course, with all the facts of the digestibility and nutritive value of pie which we now have before us, we know that the real reason why pie wasn't good for Mary was because so much hard work went into its making. Today mothers do not need to limit the consumption of pie that they may be spared the hard labor of making them. The pie baker has lifted the burden and makes it possible for children to satisfy their pie urge without a hard, hot, baking day for mothers.

The studies of pie which have been going on at the American Institute of Baking for many months have broken down the taboo against pie as an unwholesome and over rich food. There is now no scientific reason why children should not eat pie as freely as they eat any other good food.

"There never was anything made but what someone could make it worse and sell it for less."

The Iodin Problem and Food

By C. B. MORISON.

American Institute of Baking

ONE of the most important and vital problems of better community health is that of providing an adequate supply of certain indispensable constituents to the diet. The absence or lack of these "little things" in our foods is responsible for various complicated conditions which have been termed "deficiency diseases." A knowledge of the relation of faulty diets to such diseases has shed new light on the place of many foods in the dietary and has brought about a revision of some of our ideas about foods, their composition and nutritive properties.

It is now held that there are no single natural foods that are complete since laboratory experiments have shown them to be deficient in one or more constituents necessary for proper nutrition. Mother Nature, as far as we know, has not yet created a complete food able to satisfactorily nourish an animal over the total period of its life history. Even milk, the natural food of the young and nursing animal, is deficient in certain constituents necessary for adult requirements. Those who go to Nature's cupboard for a complete single food are bound to be disappointed.

Among the "little things" which Mother Nature has not provided with impartiality in our foods is the element iodine. It is now known that the lack or insufficiency of iodine in the diet is one of the causes of the disease known as goiter. In certain regions of the country she has not provided enough iodine in the foods and drinking water, with the consequence that many of her children suffer from goiter. It took a long time

for the physiologists and chemists to find out that a lack of iodine had any connection with goiter, although it had long been suspected that a faulty diet had some connection with it. Iodine was first discovered as an essential constituent of the thyroid gland by Baumann in 1895, and since then much important work has been done on the problem of this element in nutrition from many interesting angles.

It is now generally accepted that an iodine deficient diet is responsible for the origin of most cases of simple goiter and that the goiterous condition may be overcome by the proper administration of an iodide, as was demonstrated by Marine and Kimball at Akron, Ohio, in their studies on school children. Their work showed that 99% of the simple goiters in the Akron region could be prevented by the suitable administration of sodium iodide. The incidence of goiter in several Swiss cantons has also been reduced by similar measures.

Since goiter appears to be an iodine deficiency disease, the provision of an adequate supply of iodine in the diet is of the highest importance to many communities located in the so-called goiterous regions of the country. Recent studies of the iodine content of the water and food of the goiterous and non-goiterous regions of the country by J. F. McClendon of Minnesota have shown that the amount of iodine in our foods bears a direct relation to the iodine content of the soil upon which they originated.

The following table, showing milligrams of iodine per metric ton of dry foodstuff is taken from McClendon's work.

Table 1. Milligrams of Iodin per Metric Ton of Dry Foodstuff

From Non-goiterous Regions		
	Iodin Content	Locality
Wheat	4	Storrs, Conn.
Wheat	9.3	Edgecomb, Me.
Oats	23	Storrs, Conn.
Oats	175	Wiscosset, Me.
Corn	52	Wiscosset, Me.
Barley	73	Storrs, Conn.
Rye	3.5	Storrs, Conn.
Carrots	170	California Coast
Salmon	45	Alaska
Salmon	75	Oregon
Salmon	115	Alaska
Salmon	324	Alaska
Goat's Milk	400	California Coast (Salinas)

From Goiterous Regions		
	Iodin Content	Locality
Cereals:		
Oats	10	Minnesota
Wheat	1	Minnesota
Wheat	6.6	Minnesota
Straight Flour	3.5	Minnesota
Bran	15.5	Minnesota
Shorts	9.6	Minnesota
Red Dog	3.7	Minnesota
Pot Herbs:		
Spinach	19.5	Oregon
String Beans	29	Oregon
Carrots	2.3	Oregon
Soup Vegetables	13.5	Oregon
Fruits:		
Apples (peeled and cored)	3	Oregon
Pears (peeled and cored)	15	Oregon
Prunes	4.8	Oregon
Bing Cherries	33	Oregon
Peaches	11.1	Oregon
Loganberries	160	Oregon
Animal Foods:		
Skim Milk	12	Minnesota
Butter	140	Minnesota

The food produced in the non-goiterous regions of the country contained more iodine than the food from the goiterous regions. Similar results were obtained by Von Fellenberg who found more iodine in the food of the non-goiterous regions of Switzerland. The foods which contain the most iodine are the so-called "protec-

tive foods," milk and green vegetables, which are so important for their vitamin and calcium content.

The iodine content of sea foods has been studied by Tressler and Wells of the United States Bureau of Fisheries. Since the world's iodine supply is mostly found in the sea, which according to McClendon contains 60 billion metric tons of it, it is not surprising to find that sea foods, particularly some forms of the marine algae, are very valuable sources of iodine.

In the goiterous regions of the country it is very probable that no locally grown food will contain enough iodine to meet the body's requirements and for this reason methods for increasing the iodine content of the diet must be considered. The problem is thus not so much one of determining what foods contain the most iodine and selecting them with the object of increasing the iodine supply, but as the recent report of the Committee on Nutritional Problems of the American Public Health Association points out, "The prevention of goiter is thus a nutritional problem whose immediate solution depends not so much on detailed knowledge of food values as upon methods which lie largely in the province of the health officer."

Methods for increasing the iodine intake should then be based upon the regulated addition of iodine containing compounds to the diet, such as the administration of iodides under medical supervision to the school children, the addition of iodides to the water supply, the use of iodized table salt, and the administration of marine algae which according to some investigators furnish a particularly desirable form of iodine.

The addition of iodides or iodine containing preparations to bread formulas has been suggested by some as a possible means of increasing the iodine content of the diet. Such a practice does not seem

to be either practical or necessary in view of the more desirable methods that have been suggested, and also to the inherent difficulties of standardizing and controlling such additions by the baker.

Another thought in this connection surrounds the grave problem of making a food product of the nature of bread, serve as a medium for medication. Bread as manufactured today from standardized ingredients familiar to every baker is a food whose nutritional properties are fairly well understood as the result of much recent experiment. The addition of compounds other than those of the usual dough batch for the production of special types of medicated bread for use in the popular treatment of various diseases and conditions which are best treated under medical supervision would obviously lead to much misrepresentation and abuse.

Prophylactic measures for the prevention of goiter should remain in the hands of public health officials and the medical profession, who will employ those methods most advisable to meet local conditions and individual cases.

REFERENCES

- Iodine in Nutrition. Goiter as a Nutritional Problem.
Report Committee on Nutritional Problems.
Am. Jour. Pub. Health. 14, 1038-42, 1924.
McClendon, J. F. and Williams, A., J. A. M. A. 80, 600, 1923.
McClendon, J. F. and Hathaway, J. C., Proc. Soc. Exp. Biol. and Med., 21, 129, 1923-24.
McClendon, J. F., J. Biol. Chem. 55, 289, 1924.

Bad Food — Bad Children

A NEW responsibility has come to the baker. In his hands he holds the remedy for conditions which must be corrected if the undernourished children of today are to become efficient citizens in the years ahead. Bread, the product of modern bakeries, must meet the nutritional

demands of our children. It may well do so. But two things are necessary, a well built loaf, made of good flour, milk, yeast, sugars and shortenings, and an increased consumption of such bread.

Children who eat all they should of this real staff of life will never be undernourished because of lack of proper food. They will not be counted among the thousands of "bad" children in the country who do not need punishment but who in the belief of Dr. Louise Stanley, Director of the United States Bureau of Home Economics, "do need nutrition."

Doctor Stanley holds "that 'bad' character is often the result of bad food."

"With every child," she says, "there is a very definite connection between what he eats and how he acts.

"And the actions of an improperly fed child are apt to correspond closely to his physical condition."

"Her theory is based on the proposition that the human physical and mental structures are so closely allied that each is bound to react on the other.

"A run-down, enervated body is almost sure to mean a run-down, enervated mind—and malnutrition means a run-down, enervated body.

"The undernourished child is dull, nervous, irritable and bad-tempered."

Dr. Stanley says:

"He is behind in his school work, takes little interest in it, and is hard to discipline.

"Because of all this, he is probably known as 'bad.' His characteristics are considered natural. That is the way he is made—just as some children are made with blue eyes or curly hair!

"As a matter of fact he is simply laboring under the handicap of poor health, the result of improper feeding. His mind cannot function properly because his body is below par. His nerve resistance is weak because his physique is poor."

Pies Are Real Food

By ROSCOE H. SHAW

Department of Nutrition, American Institute of Baking

WE eat a food sometimes because it has a tempting appearance, sometimes because of its appeal to our taste, sometimes because we are convinced that it is good for us, and, yes—sometimes because it has been cooked by someone whose feelings we do not wish to hurt by refusing. But after all, the real reason for eating a food should be for its nutritional value.

Pies are sometimes eaten as an important part of the meal, because some of us realize that they have high food value, but as a rule they are eaten at the end of a hearty dinner when the appetite has already been appeased, and no more food is needed. Pies are real foods and it has been suggested that their place is not at the end of the menu but rather nearer the beginning.

Balanced Foods

In previous papers we have shown that very few single articles of food are so balanced and complete in themselves that they alone can supply all the necessary food essentials for growth and maintenance. It is only when a variety of food is eaten that our body requirements are met.

How do pies fit into our scheme of nutrition? We require proteins to build new tissues and repair the old broken down ones. We require carbohydrates and fats to furnish heat and energy. We require mineral salts such as lime for the bones and teeth, phosphorus for the nervous tissues, iron for the red corpuscles, etc. Then too, we must have the vitamins which are a comparatively recent discovery but which have been found to be so necessary for our growth and well-being. Proteins because of primary cost are the expensive part of our foods. Proteins

will serve as sources of heat and energy as well as tissue cell builders. The carbohydrates and fats have been called protein spacers because they relieve the protein from acting as a source of heat and energy. Very few foods combine all these essentials.

Pies as Food

Pies vary greatly in their food value depending of course upon their nature. They are all good heat and energy foods on account of both the starch and fat in the crusts and the sugar in the filler, and some of them as we shall show later, are exceptionally well-balanced foods.

Apple pie, according to Sherman has slightly more food value, pound for pound, in terms of calories, than does wheat bread, so while low in protein, it is an excellent food from the heat and energy supplying standpoint. The same is equally true of the various berry pies which also supply vitamins and mineral salts. In mince pie we have a rather more concentrated food because of the meat that the filler usually contains.

Some Pies Nearly Complete Food

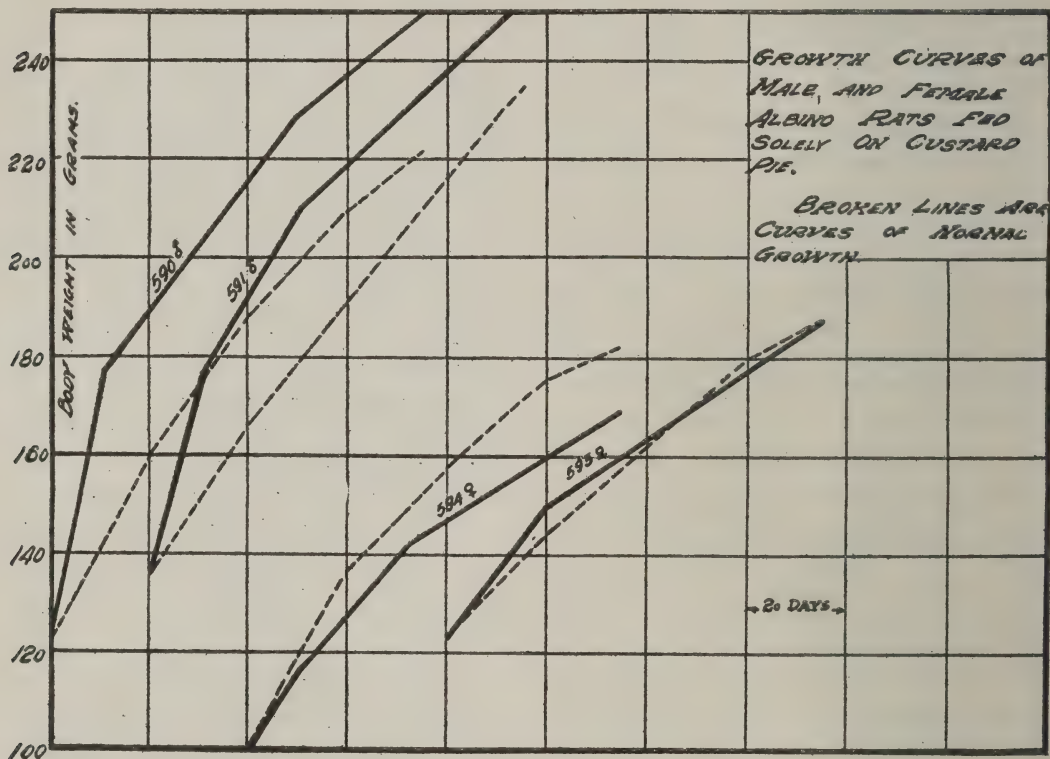
In other papers we have emphasized the fact that few single foods are complete in themselves,—that nearly all lack balance. Among these few we would perhaps hardly expect to find pie, yet the group of pies including custard, pumpkin, squash, sweet-potato, and others, come about as near being complete as any single article in our whole category of foods.

In other reports we have shown how albino rats grow on some of our ordinary foods such as rice, potatoes, cabbage, spinach, bread, etc., and so we fed some rats on custard pie as typical of a group

of pies to show how this food compares with the others. Without going into detail, the pies were made in the bakeshop of the Institute in exactly the same way as they would be for human consumption. Two eggs per pint of milk were used, and the usual amount of sugar, spices, etc. After the pies were baked they were dried at a low temperature by passing a current of warm air over them by means of a fan. When the drying was completed,

The Feeding Test

The feeding test was conducted in the usual manner, the rats being young and in their vigorous growing period. They were confined in individual cages and in addition to their diets received plenty of clean drinking water. They were under fairly constant observation and at frequent intervals were weighed. From the weights so obtained the accompanying chart was prepared.



which as a rule took about 10 hours, they were ground in a power mill to a coarse meal which was then thoroughly mixed and used for feeding. This procedure was found necessary because if fresh pies are fed to rats, they will select the part that appeals to them most and leave the rest. When fed to them dry and pulverized, they can make no selection but are forced to eat it all.

It was very apparent from the first that the rats liked their diet. They grew in a very satisfactory manner and at all times had the sleek appearance of a well-nourished rat.

Male rat 590 weighed 122 grams at the beginning of the experiment and at the end of 75 days when this report was made, it had increased to 250 grams. Male rat 591 weighed 136 grams at the beginning

and 254 grams at the end of the 75-day period. Their growth curves show that they grew faster than does the average rat on a complete diet. Female rat 595 weighed 124 grams at the beginning and 188 grams at the close. Her growth curve follows very closely the curve of normal growth. Female rat 594 weighed 100 grams at the beginning and 170 at the end of the 75-day period. Her growth curve is slightly below the normal growth curve. The average gains in weight in the four rats is considerably above the normal gain as given in Donaldson's tables.

Custard Pie a Good Food

It may be concluded from this chart that custard pie is a complete food in so far as the growth of young animals is concerned. As pointed out previously, this result was to be expected on account of the eggs and milk used in making custard pie. The proteins of the wheat flour are bolstered up by the proteins of the eggs and milk. The carbohydrates are represented by those in the flour, the sugar of the milk and the cane sugar used. The fats include the shortening of the crust, the butterfat of the milk and the egg fat. Mineral salts are supplied by both the egg and the milk which are also among the very best sources of vitamins.

Shall we not say then that the group of pies represented by the custard pie, deserves a prominent place in our diet?

A letter received from a university student who had received material from the Louis Livingston Library of Baking for his thesis says: "I have found much of the information invaluable in the writing of my thesis, and also have become acquainted with some facts regarding the baking industry that I had never known before, although my parents operate a bakery and I have been closely associated with the business for several years."

Toast Scores Again

IT is still too soon to tell how far the Toast Campaign idea can go in bringing about a greater consumption of bakers products. Nearly a year after the Toast Campaign was first discussed with Tacoma and Seattle bakers we read accounts of the splendid success achieved by the co-operative campaign of the bakers in Tacoma.

The April issue of "Business" and the May numbers of "Retail Baker" and "Bakers Helper" all tell the story of how bread and bakers products, helped by milk, meat, flour, raisins, yeast and cheese, were sold to Tacoma people as the healthy food. School children instead of losing two weeks of valuable study when the schools were closed improved their time by writing essays about bread and bakeries. The lessons learned in the bakeries of Tacoma will make them lifelong friends of baker's bread.

The grocers competed with each other in making their windows sell more loaves. The careful planning and successful conclusion of their cooperative campaign by the Condon-Milne Advertising Agency has made it, like the Pittsburg campaign, a model for other cities to follow.

L. A. R.

"My copy of Baking Technology came today and as is always the case I find it full of interesting and good writing.

"I have spoken to more than one thousand women a month for the past year and I have emphasized to them the necessity for economic reconstruction of the home with baker's bread as a text. It is amazing how slowly old traditions leave the public mind. The traditions that the baker's loaf is poorly made from non-nutritious ingredients under questionable conditions is still tenacious."

—Elizabeth Macdonald,

Field Editor, The Modern Priscilla, Boston.

Light from Without on Baking

How a Sister Industry Grew in Forty Years Under Difficulties to Second in America, While Baking Grew to be Seventh.

By I. K. RUSSELL

Of the Freeman-Smart Company, Chicago

A MAN in San Francisco conceived that his industry had consisted of little isolated units long enough and that it ought to hold a National convention. So he invited all the companies of which he had knowledge. Half the letters came back unopened showing that the addresses were unknown in the places where the letters went.

Of the half that answered, half sent indignant refusals. They felt that they were the "big men of the industry" and the "small fry did not count." This industry was the electrical industry. It is just as old as the baking industry in America. It has had thirty-seven national presidents while the baking industry has had only twenty-seven. It has a ten year longer story as an organized industry than American Bakers Association has had.

And in that time the "small fry" that the "big men" ignored have pushed forward until the thing that made the "big men" of that early day has been pushed entirely off the map. It is now only a memory, and the "big men" who would not organize are not even that. The "small fry" have absorbed seven billion dollars in capital, and are soaking up new capital at this moment faster than any other industry upon the earth.

They are after super-power and chaining up all sources of power production with all sources of power demands, so that the flow of power shall be continuous to all points where it can be used.

Just before starting to write this story of a comparison of growing methods in the baking and the electrical industries,

I attended the opening exercises of the latest thing in power plants. It reminded me of nothing so much as the opening of the latest thing in bakeries which I attended in Toronto, Canada, at the plant of the Canada Bread Co. There three giant ovens, working side by side, were capable of turning out as much bread per day as 36,000 women. Bakers enthused over those giant travelers as the latest work in baking science.

Here in the new Central Station electricians enthused over turbo generators. What made them go wild about them was that the largest one would turn out 75,000 kilowatts of electricity whereas the capacity of the one on which Edison started the industry off would only turn out 25 kilowatts, and within the memory of many of those who gloated beside the 75,000 k.w. machine a turbo generator of half that size was considered a world marvel. I had to take their statement that it would do the 75,000 of faith. That one machine was not yet finished. Of the three actually at work two were fifties and the third a sixty-thousand—the marvel of the power world only two years ago when it was designed by Steinmetz!

And the crowning glory of Steinmetz' life it was. And here we were very close to the baking industry for the synchronous motors of this same Steinmetz were what made big unit production in bakeries possible. They handled the mixers, conveyers, dividers, rounders and moulders, at speeds regulated to keep the loads moving with never a pile-up of dough at any point along the path of its progress from mixer to wrapping machine.

We know our bakery engineers and how they focus their thoughts since Julian Livingston got them organized, upon production problems. Well here were friends in the Central Station—friends of the Western Society of Engineers. Friends, why? They had held meetings at the American Institute of Baking and had fellowshipped there with the baking industry's National headquarters staff.

To them the new Power Plant meant one thing of glory. They had so studied fuels and fuelings that if all the existing plants in Chicago were making electricity as cheaply as this new one, then the industry could save itself 1,000,000 tons of coal per year out of the 2,900,000 tons of coal burned up in the production of Power!

This, indeed, was triumph, and these engineers were aware of that triumph as they heard Samuel Insull announce the achievement they had attained. All through the baking industry we hear our own engineers speak of these potential economies—of the savings the floor scale can make for the baker, and how the control of invisible losses will make profits much more visible. It was all the same—whether in electricity or baking. The engineers had been blood brothers at the same tasks.

At this moment the bakers of America are looking hopefully towards Buffalo for the largest world's fair and convention series their industry has known. Will it succeed? Everybody hopes so. Yet nobody knows for sure, and it all depends on how a great many people feel, who have no direct command to go there.

San Francisco and Buffalo

The electrical industry's leaders are looking towards San Francisco at this moment in just the way the bakers are looking towards Buffalo. They head for San Francisco from exactly the same background. As the electrical men organized

they put up an umbrella over the whole industry, and called it NELA. They have a NELA Park, called "Nela" for short. And that word is made up of the initials of "National Electric Light Association." Their convention at San Francisco is managed by a director named M. H. Aylesworth. He has assembled such national leaders as Herbert Hoover for his speaking program, just as Dr. Barnard is assembling men of the same class for his speaking program at Buffalo. The guidelines to both industries are the same and Hoover's speech will fit one convention as well as the other. It is simply that the great family of industries must make the tariff its business, the government its business, the capturing and holding of good will its business.

If some bakers have been tired by the constant preaching of organization in the baking industry, through Baking Technology, then the electrical men have had to face the same kind of a journal in the N. E. L. A. Bulletin. The Bulletin is the voice of the Industry. Like Baking Technology it is printed without advertising so that its voice may sound what is for the welfare of the whole industry, as an honest editor sees it, and no strings of self interest to pull him aside. Through the N. E. L. A. Bulletin the Director of the Association has preached the gospel of the National vision. He has sold vision to the Industry's members, until they have learned to pull together and grasp a common sense of all that is in the air in the way of future problems.

Baking Technology is in the midst of its fourth volume. Their Bulletin is in the midst of its 12th volume. If by the time Baking Technology is eight more years old, the baking industry can accomplish the enormous strides of its forty-year old brother,—what won't be possible in the way of achieving organized purposes!

From Low Voltage to High

Now here is the story of the upward thrust of organization within the electrical industry that carried it from low to high voltage in potentialities. It starts with a row of very familiar lines. The "arc light" men thought they were the whole show and looked down upon the incandescent light men. Maybe some of the oldsters who read this will remember the arc lamps of old—the stick-of-carbon lamps that in some cities were placed on high towers! The incandescent lamp men came together to mutually solve their problems. They had given away electricity for the first 500 lamps installed for five months to prove that incandescent lamps would burn! With wiring in the homes, an engineering problem arose. How should a house be wired so it would not catch fire from short circuits? A young engineer took hold and gradually developed the science of insulation. He also developed the science of wiring and codified into an insurance code. For this he was honored. The electrical industry has always honored its leaders, whether as lawyers they devised the proper plan for organization of a Power company, or as engineers they developed transmission lines. The man who developed insulation to a science was William H. Blood, Jr., and he was honored for it with a term in the presidency of the National Electric Light Association.

Can the baking industry so honor its engineers? First the engineers will have to be admitted as a body into the American Bakers Association. And if their means of entrance matches that of the electrical engineers, they will become Class H, or J, at a nominal fee and any one of their members can then be a proper candidate for the presidency.

At its last convention the electrical men met at Atlantic City just as the bakers did. The convention management felt one

deficiency. A thousand men showed up to register after the last convention button had been passed out and the buttons had been ordered far ahead of the largest number it was expected to have on hand.

Second and Seventh

Now why will they go to their conventions? Why have they climbed in forty years to be a seven billion dollar industry, exceeded only by the combined steam railroads with their twenty-three billions of invested capital? It is purely an Institute story—an Institute story just such as the American Institute of Baking can produce for the baking industry.

First of all the men of the industry had to be sold on the idea of cooperation, and on the idea that backbiting is a folly and fears and suspicions of vicious intent are mere nonsense and work for harm, not good. Not so long ago nearly all electricity was produced at three times the cost in coal now required in little 10,000 k.w. turbo generators. Somebody saw the larger vision of locating these stations at the strategic spots where coal could be delivered cheapest, where waterpower was most available, and where the market could be most strategically reached. Thus in the middle west, Waukegan and Michigan City, Peoria and the banks of the drainage canal, Chicago, were all seen to be strategic spots for the location of power plants. The Loop, Chicago, was seen to be the center of potential load, with the Calumet manufacturing district next. Samuel Insull, who had been the gadfly in the flesh of Steinmetz while he built larger, larger, and still larger turbo generators, conceived the idea of running high-tension wires from Waukegan to Michigan City via all of the power plants en route, including Peoria. Then he saw he would be creating the biggest power pool in the world. At this writing the wires are on their way to Michigan City.

All the rest of the pool had the high-tension lasso around its neck.

Little power plants, making power expensively, had to go down and out while this giant of super-power was reared in their places. But none who lost or profited by that change in environment and possibilities, made the National Association the battlefield for their internal warfare. They joined up to support the Institute and fought when self-interest was involved. Just so all the automobile men in Chicago joined to sell the idea of closed cars—then fought for individual orders for their own type of closed cars.

These men, once that initial fight between arc men and incandescent men was ironed out, never fought again within the upbuilding industry. Insull only applied the advances in science which any man could apply where conditions warranted, as any baker now can make an 18,000-loaf-an-hour bakery where the population will warrant it.

Some Presidents

J. Frank Morrison believed in long distance transmission. He proved it could be done when all lights were burned a few miles from the producing center. He became the Association's first president and was honored for his discovery—which Insull applied with such telling effect in creating the Illinois-Indiana-Michigan-Wisconsin power pool. Who knows who first got up the idea of long-distance bakery deliveries and applied it and so created the large-unit plant?

Samuel A. Duncan is a sanctified and sainted hero of the electrical industry. He conceived the idea it must rest, as an organized body, on the joint efforts of its engineers, its lawyers, its business accountants, its inventors, its laboratories for research. And that it must have a permanent home. He gave it one, when he became the industry's second president. Who shall American Bakers Association

honor for bringing out the idea it must have a permanent home? The facts will all have to be resurveyed some day to find out. And then the Institute can hang up in his honor a fine laurel wreath.

Edward A. Armstrong was the Elwood Rabenold of the electrical industry. He was a lawyer who began to consider its legal necessities. He graduated from the New Jersey judiciary just as Mr. Rabenold graduated from the N.Y. State senate, to become an expert on Power Plant permits and legislation. He drafted forms of incorporations—and was honored by being elected the association's seventh president.

Where are the architects and builders of modern bakeries? It took rare skill to build power plants during the era of expansion. James Blake Cahoon became a builder of rare excellence who gave the industry the standard power plant idea of his time. He became fourteenth president of the Association. You see it could welcome and honor its outstanding men of service in every field. All were in its association,—as all the sales managers, all the engineers, all the allied tradesmen, the bakery equipment manufacturers, flour men, secretaries of state associations, pie men, retail men, cake men, foreign bakeries, would be if American Bakers Association had the classes of membership of the N. E. L. A.

Employee-Relations

We all know how Sam McDonald made a study of employee relations and wanted to develop a plan under which the man on top would not unleash his wolf-born lusts to play a game of tomcat and mouse-men with those under him—running them forever off their feet so that they could not achieve anything consecutive. Sam had his counterpart in the electrical industry. Charles L. Edgar became an ideal employer from the standpoint of peace and good will within the shop. And he

also became seventeenth president of N. E. L. A. and as president preached the gospel of employee clubs. They thrive all through the industry now.

We all know Jay Burns and the way he preached sanitation as a means to attaining customer good will. The Jay Burns of the electrical industry is Frank W. Freauff. As a clerk handling complaints he memorized the names of complainants and next time they came up he called them by name and really tried to understand them—instead of just slapping them down and seeing them rage impotently. He rose on that idea and got his turn to preach it as the association's twenty-third president.

Thirteen Thousand Members

The electrical industry developed in Holton H. Scott a president who had a mania for salesmanship. He it was who took the factions and bumped their heads together until the industry was cured of factionalism. And he went out to sell the association. When he took office it had 3,000 members. When he retired after a single year in office it had 13,000 members. And all were receiving the N. E. L. A. Bulletin and so being impregnated with the ideas that were at the heart of industrial growth.

And so the story goes. You might look over the electrical industry from end to end and find it united on one point. This point is the worship of Edison, father of the incandescent lamp and the first power station. They tell their whole story in the terms of Edison's work and its expansion. The bakers have a similar hero back behind their industry—Louis Pasteur who discovered the nature of yeast. And they share Steinmetz as a hero with the electrical world, as the electrical world must, in all truth, share a claim in Pasteur. For Pasteur gave us the knowledge that dust carried bacterial life and

that to fight disease we must conquer dust, while the electrical industry gave us the tools for this fight. If bread from the baker's has relieved the housewife of kitchen drudgery then the vacuum sweeper from the electrician's has relieved the housewife of parlor drudgery. An assault on drudgery and an appeal to the instinct for leisure has been the basis of every sales campaign in both electrical salesmanship and bakery salesmanship. If Pasteur gave the electrical industry its greatest sales argument, Steinmetz put a push button in every bakery to do the work of muscle. So these are indeed brother industries, and one should know the other and its ways, and both can learn from each other. Dynamos on display with almost every machine at Buffalo will give the manufactured end of the story of which this narration is the organizing and association end. Surely the electrical progress is one to stir the baking industry to a hope of soon being able to do "likewise."

Bakers Sanitary Code

THE bakers of Wyoming and their customers are now working under and appreciating an excellent Sanitary Code recently promulgated by the State Dairy, Food and Oil Division. The code is entitled "The Production of Sound, Wholesome Bakery Products Made in Sanitary Bakeries by Healthy Workmen."

It carries as a footnote the following sentence, "We acknowledge use of parts of the Sanitary Code issued by American Bakers Association." One feature of the regulations is of especial interest and that is the provision that all bread in loaf form must bear a label giving the net weight of the loaf and the name and address of the manufacturer. They urge but do not require the manufacture of a standard loaf.

Editor, Director, Citizen

IT is not an uncommon experience in these days of extended public duties to drop in on a baker in his home town and find him receiving the respectful appreciation and applause of his fellow townsmen. They see in him the best in the baking industry and forget those unfortunate ones whose public services present only an opportunity to make money. Sometimes it is not the baker himself but one of his representatives in the allied field who spends a portion of his time and energy that his community may have a better appreciation of the finer things in life.

Saturday night, May 23rd, a long journey from Chicago's northside to the community of Morgan Park on the South was rewarded by an evening of wonderful music. A hundred well trained voices, and three of Chicago's artist soloists singing with the Euterpean Chorus of Morgan Park, presented Joseph Haydn's great oratorio "The Creation," under the baton of Edward T. Clissold.

For 25 years the Editor of Bakers Helper has been known to Morgan Park as the accomplished director of this splendid chorus. Dr. F. B. Clemmer, nationally known for his work with the Dental Association expressed the community's appreciation for Clissold's personality as one who gathers friends and holds them to him through the years. As an expression of their growing affection and love for him on this, their silver anniversary, a beautiful white gold watch was presented from the Euterpean Men's Chorus with the hope that its every tick through the coming years would be as bits of love from friends on every hand.

Now we know why bakers and allied tradesmen at conventions sing with such enthusiasm and abandon when genial "Ed," accomplished director, takes the floor and calls for No. 16 in the book.

Belt Lines and Breads

WHEN the Doctors can't find the time in these days of busy practice to search out the facts about food fads, the food chemists at State Colleges may be called to the front.

Professor John Buchanan entertained two distinguished army officers in his laboratory at Ames, Iowa, where they were in search of truth about bread.

Increasing belt line measurements during peace time service are a subject for concern to those in command. The longer the belt the lower the rating of fitness for emergency. So these officers asked for comparative analyses of white and dark breads to find out whether they could reduce by substituting the so-called health breads for their favorite staff of life.

After actual analyses had been made in order to verify the record of previous experiments, Professor Buchanan reported to the officers that the food-energy value, in terms of calories per pound, were nearly the same. In fact the difference of maybe 5 calories per slice might be easily overbalanced by the extra dab of butter which one ordinarily spreads on the darker breads. He told the officers what the family physician and the specialist should know, that the dark breads, or the so-called anti-fats breads have no reducing properties in themselves, but that loss of weight comes from eating less of heavy foods and sweets and from the careful regimen of exercise which is always prescribed for the patient.

Baking Technology for May adds more evidence to the falsity of claims for reducing breads and should be handed to the physician to protect him from the misinformation of food faddists.

Professor Buchanan received the thanks of the Iowa State Convention for discussing this subject with them in his clear and interesting manner.

—L. A. R.

Market Analyses Show Facts

Consumer Surveys Locate New Customers Required by Bakery Competition

By L. A. RUMSEY
Trade Promotion Department

Abraham Lincoln once said: "If we could first know where we are, and whither we are tending, we could better judge what to do and how to do it." Mr. Hoover in addressing his staff, has expressed the need for accurate information in different language. He said: "I was taught young the potency of truth: that it would prevail. The raw material of truth is facts. Statistics are not mental exercises; they are for a purpose; they are the first step to right decisions, to enlightened actions, to progress itself." One of the functions of the Trade Promotion Department is to gather statistics bearing on the baking industry and publish them in such a form that they may help the baker to better appreciate his opportunity for business growth and plan for future progress.

17. Does the increase in consumption pay dividends on the investment in market analysis? Yes! This is the positive record, with two exceptions, of every completed market analysis reported. By completed, we mean the collection of sufficient information to give an accurate picture of the consumer's buying habits in each section of the territory served.

Such information when once obtained will represent the concensus of facts, the ultimatum of public opinion, which must guide the executive if he is to be successful in his efforts to increase the number of consumers, or the amount of their purchases. Market analysis then becomes the scientific compilation of data and information on which to base a successful program of increased sales. If no use is made of the data obtained the cost of making the survey has been wasted.

Although systematic study of the consumers' preferences and opinions is comparatively new in the baking industry, manufacturers of other food products and commodities have regularly employed that method as the only reliable means of regulating production to meet the needs of their possible market. The baker, instead of having to curtail his production, is surrounded by a potential market

which, in most sections of the country, greatly exceeds his present capacity for production. It is only in recent years that competition within his own industry, and from other food industries, has made it necessary to seek more customers than those who naturally came to him with the drift of home baking away from the kitchen. Home baking still remains the largest immediate source of increased sales, and therefore becomes the subject of first importance for the bakery market analyst.

Methods Employed

A study of all replies to the questionnaire on market analysis shows that many different procedures were followed. These for convenience may be grouped into three general plans.

The employment of trained women canvassers or demonstrators who call in the homes and secure information by direct contact with the housewife appears to be the most satisfactory procedure. They are responsible for the greater share of all the data reported. The women canvassers, in addition to securing answers to a series of predetermined questions, may also carry samples of the bakers' product, and in some cases may be charged with the delivery of a demonstration and sales

talks. In that case they become more than market analysts since they fulfill the function of direct advertising. Most of the bakers answering the questionnaire indicated their preference for the personal interview through house to house contacts by women demonstrators.

It is common practice to fill out cards for each interview, with complete data as to family, amount of home baking, preferences for different types of products, and personal opinions which may be responsible for the buying habits of that household. These cards when classified are not only the source of essential information, but from them can be made lists for the grocers and for special literature and advertising.

At least a dozen baking companies keep a well trained woman permanently on the payroll to direct all special market survey work and to keep in close touch with local opportunities for sales promotion service. Others employ one or more of the high school teachers trained in home economics through the vacation months.

The second method of obtaining information about consumers is from the groceryman and through contact with the buyers in grocery stores. That is usually done in connection with displays and store demonstrations. Eleven of the market surveys made by baking companies used both home canvass and store contacts, while only three reported results secured through the stores alone.

In the third group we can include such other plans for securing information as: published literature, statistics, the personal questionnaire, and information obtained through inquiry and study by the sales manager or members of his department. Under this heading should also be included the use of the telephone. One baking company, from a larger city, reports its constant and satisfactory use of the phone in charge of an intelligent

young lady of pleasant voice who verifies any doubtful information and secures a great deal of data from sources not reached by personal canvass.

Opportunities Overlooked

It would seem that this is an opportunity too often overlooked, especially by those bakers whose smaller volume of business has not seemed to warrant the expense of a thorough survey requiring additional employees. Another source of intensely interesting and valuable sales information has not been utilized as it might be, and that is the school children. The reason for that is probably due to the slowness with which bakers have approached the educational problem and their hesitancy to take their proper place in the public health service work against malnutrition in the schools.

Nearly half of the market studies reported were conducted for the baking companies by outside agencies. These agencies were either Bakery Service organizations, advertising agencies or allied trades manufacturers of flour or yeast. There seems to be no excuse for not taking advantage of the helping hand extended to any baker who desires to know more about his market in order to intelligently enlarge his sales effort.

The records of market analysis come from cities of all sizes with population varying from 5,000 up to a million or more, so that the size of the community served has nothing to do with the value of the information obtained. In most of the cities the population is made up of what may be called different classes of people, either of different nationalities or different occupations, grouping themselves in sections. The result is a wide variation in bread consumption and in home baking. For example, two different sections of a Minnesota city show a minimum of 17% home baking and a maximum of 65%, while the average value of 44% indicates

the market still to be won for bakers' bread. But even figures do not complete the picture because further inquiry shows that about 17% of the families interviewed sometimes buy and sometimes bake. One of the southern cities reports an "uncertain" market of 28% where baked products are both purchased and baked at home, while 65% of all bread is home made.

These facts illustrate the danger of drawing conclusion from an insufficient number of separate inquiries. No rule can be given as to the percentage of total family groups which should be interviewed, but a representative cross section must be made of each separate district in the city and suburbs. In a city in Texas recently a market analysis was in progress where the cards with their detailed information were available for study as they came in daily. The first few hundred records, all from the same neighborhood, averaged very well with each other, but the second week's work in an adjoining neighborhood showed different percentages from the first; likewise the third from the second. It was then decided that at least five thousand individual records from all sections of town must be collected before accurate conclusions could be drawn. 2,500 to 3,000 different interviews are average for most of the surveys reported but two cases are on record of 20,000 and 30,000 separate records being made in Seattle, and Chicago respectively.

The importance of thoroughly covering the territory with sufficient inquiries is further emphasized by two replies by different companies from the same mid-western city. Neither had made a careful survey, but each based their estimates on what they considered a close observation and familiarity with sales conditions over a period of several years. The first esti-

mated home baking at 25% and the second at 40%. The probability is that neither was right. To base either a manufacturing or a sales program on an estimate which is 50% wrong would hardly be good business. No national advertising agency would risk its reputation for effectiveness on a campaign which has not been built upon a complete analysis of the market to be covered, no matter what the commodity advertised. Their lesson has been well learned from costly experiences over a number of years.

Surveys Increase Business

The principal value of such consumer surveys, however, is not in the figures for percentages of home baking. Under present conditions it lies in the answers to questions and opinions of the family's purchasing agent about economy, quality, sanitation and nutritional value of the baker's product. And further than that the immediate interest of the housewife is aroused, which in itself is the first and fundamental problem of every sales effort. When this interest is immediately capitalized by information about, and acquaintance with the modern baker's service in essential foods, increased sales invariably follow. Almost without exception those bakers who were interviewed about market analysis stated that they were surprised at the information obtained and delighted with the new ideas presented for their sales promotion work.

It is a matter of record that the percentage of home baking is considerably lower in every city where bakery market analyses have been carried on than in surrounding cities where no promotional work was done. That means better business for all bakers in that market. Other bakers products besides bread were sometimes included in these analyses, but the cases are too few and widely scattered to permit of any definite conclusions.

Housewives' Preference

Question twenty asked for the reason most frequently given by the housewife for **not** using bakers' products. A tabulation of answers is significant when it is realized that these represent the opinions of almost 80,000 housewives.

Taste (or flavor).....	30%
Quality of product.....	11%
Economy or cost.....	40%
Insanitary handling or delivery.....	3%
Other reasons:	
Insufficiently baked	9%
Husband's preference for homebaked..	2%
Freshness	5%

Remarks by Bakers

"What were the outstanding facts you learned from this market survey?" was the concluding question. A few of the replies are so interesting that they are printed here.

"That it is by far the best way to advertise."

"Possibility of increasing sales."

"After a complete canvass of a town we found that our business was better."

"We know just exactly where we stand."

"1. The indifference of grocers to the bread business. 2. The indifference of the housewife as to the quality and food value of different kinds of bread. So many seem to think all bakers' bread alike."

"In a community or city that is being served with the quality baker's bread, the home baking is steadily diminishing."

"Most women agreed that we made better bread than they could make."

"Older folks are leaning toward whole wheat breads—younger folks insist upon white bread."

"That the baker getting his bread to the grocer or the housewife the freshest, all other conditions being equal, gets the business."

"The public demands a loaf that will give absolute appetite satisfaction."

The discussion of these opinions will be left for a future Trade Promotion Conference.

Cost

From the few records available we would say that a thorough market analysis should not cost over 1% in terms of total sales per year. Some have been made for .5% and others for less. In terms of advertising that is a low figure, because it is estimated that the baker who advertises regularly will average 3 to 3.5% of total sales on his advertising budget.

So many of the surveys reported were charged on the books as part of the year's advertising effort, or were handled by outside agencies, that more accurate statements of cost are not available at this time. It is planned to continue collection and compilation of figures and data on market analysis, in the interest of accurate statistics about our industry.

Conclusions

Market analyses by members of the baking industry have been few and far between. Figures published from time to time have too often been rewritten from old data, with the addition of whatever new material was at hand and from estimates calculated from supplies of raw materials.

The Bureau of Census, United States Department of Commerce, figures all baked products in terms of flour used between 33% for bakers and 66% for home producers. That average is for town and country. Since 94% of all bread used on the farms is home baked ("Farm Journal," survey of 1923) and approximately half of the population is rural, the percentage of home baking among urban population in towns of over 2,500 must be somewhere around 40% to maintain the average. But averages are misleading. Probably no two cities will show exactly the same percentages and these are constantly changing. For example the "Farm

Journal'' investigation for 2,117 cities and town families over a wide section of the Eastern, Central and Northern states showed that in towns and villages under 5,000 population 74% of the families bake part or all of their own bread, 73% in cities from 5,000 to 25,000 population and 59% in cities over 25,000 population. Eliminating those who sometimes bake and sometimes buy their bread, the last figure would be reduced to approximately 46%. These again are averages.

A much better picture of the market waiting to be developed by the baker is given by the actual figures obtained from replies to the Institute questionnaire. Home baking is given in percentage and includes those families who sometimes bake and sometimes buy. This group can roughly be calculated as 15% of the total home baking. The population of cities is rated into three groups. Those of over 100,000 population are denoted by (A), those between 25,000 and 100,000 by (B), and those under 25,000 by the letter (C).

State	Cities Reported	Size	% Home Baking
California	Two	(A)	12
		(A)	2
Connecticut	One	(B)	39
Illinois	Three	(A)	60
		(B)	50
		(B)	60
Indiana	Two	(A)	5
		(B)	10
Iowa	Three	(B)	20
		(B)	42
		(B)	44
Georgia	One	(A)	35
Massachusetts ..	Two	(A)	50
		(B)	39
Minnesota	One	(A)	44
Montana	Two	(C)	50
		(B)	50*
Nebraska	One	(A)	{ 25*
			{ 40*
		(A)	5.4
New York	Three	(B)	{ 5.0
			{ 9.0
		(A)	5.0
North Dakota ..	One	(B)	{ 60
			{ 70*

State	Cities Reported	Size	% Home Baking
Ohio	One	(C)	39
Oregon	One	(A)	{ 18
			{ 13.5
Vermont	One	(C)	50
Washington	Two	(A)	50
		(A)	35
West Virginia ..	One	(B)	5-10
Wisconsin	One	(B)	51

*Estimated.

Several facts are at once apparent. The amount of home baking which has been won for the baker depends upon two conditions. Families in the Eastern cities have given over the responsibilities of baking to the bakers who most insistently advertised the economy, quality, and health values of their products. In the far West the newer communities, in climates favorable to outdoor pleasures, found the highest quality of baked products waiting for them, and no incentive for the drudgery of kitchen baking. In other sections of the country the bakers' market is still waiting to be persuaded, to the extent of 40 to 50% for bread and 85% for sweet goods in cities, while the farm families offer at least 90% of their business to the baker who can find an economical method of supplying it.

When the greater share of home baking has been transferred to the bakers' ovens, he will still have a great market awaiting the time when he, as part of a unified industry, can increase the per capita consumption of his products through education and sound advertising. He has no time for petty jealousies with such a program ahead, but economic service will insure his future.

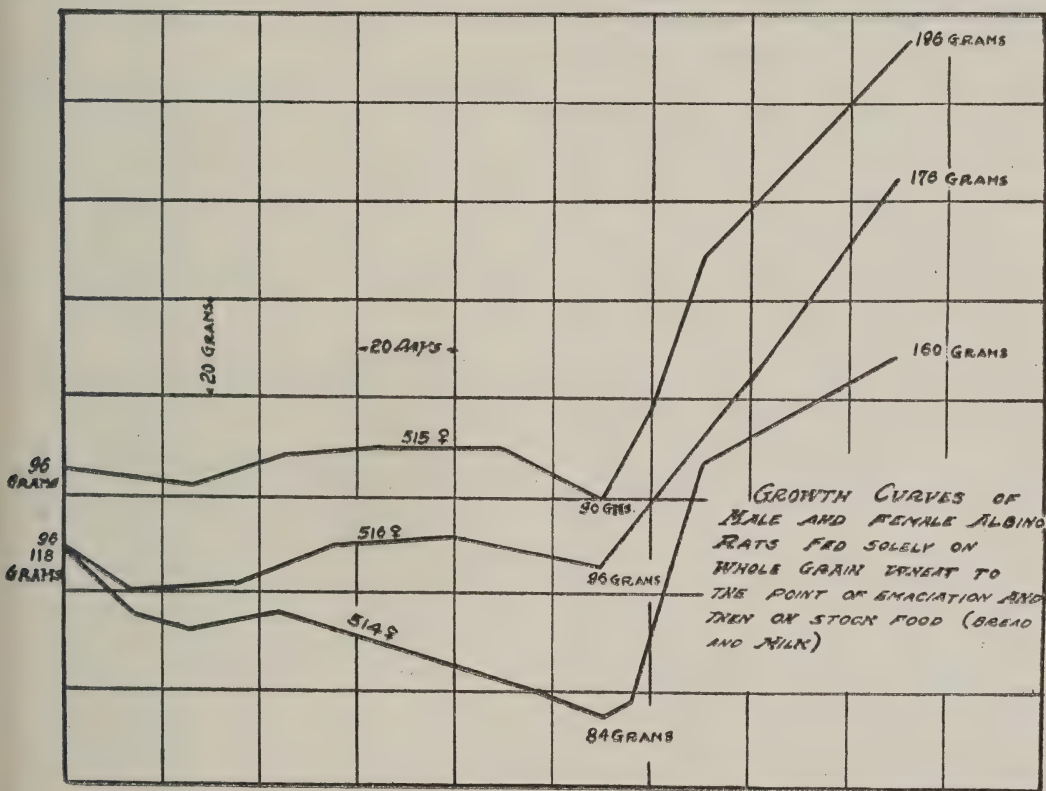
The Trade Promotion Department appreciates the assistance and cooperation of all those who replied to the questionnaire on market analysis. The number of replies was low, being only 12% of the total number of questionnaires sent out, but in this case it is known that less than one per cent of those bakers who failed to reply have made any market survey.

—L. A. Rumsey.

More Whole Grain Wheat

IT will be remembered that in the Whole Grain Wheat experiment published in Baking Technology for April, 3 of the rats had died and 3 were living at the time the report was made. These rats were in an emaciated condition and one showed symptoms of xerophthalmia.

Wheat. At the end of the experiment she weighed 84 grams. After two months feeding on stock food she weighed 160 grams. In the same way female rat No. 515 weighed 96 grams when placed on Whole Grain Wheat, lost in weight to 90 grams at the end of the experiment, and



At that time the food was changed to our laboratory stock food which is made by mixing 2 parts by weight of dried bread crumbs with 1 part by weight of powdered whole milk. There was an immediate response. The emaciation of course disappeared as well as the eye trouble and the animals started to grow. Female rat No. 514 weighed 118 grams when placed on her diet of Whole Grain

after two months on stock food weighed 196 grams. Female rat No. 516 weighed 96 grams at the beginning, fluctuated in weight, and at the end weighed the same, that is 96 grams. After two months on stock food she weighed 176 grams.

The rats are all living at this time and have evidently regained their health, having all the appearance of being in good condition. Bread and milk is a real food.

Technical Yet Practical

Abstracts of Some of the Papers Given Before the American Association of Cereal Chemists

In the Association of Cereal Chemists all men interested in the chemistry of cereals and cereal products find a common meeting place. At the annual convention held at St. Louis, June 1-6, many subjects of fundamental importance to the miller and baker were discussed.

By arrangement with the editors of Cereal Chemistry, the official publication of the Association, we print herewith abstracts of some of the important papers. Other abstracts will appear in later issues of Baking Technology.

Effect of Hydrogen Peroxide on Relative Viscosity of Wheat and Flour Suspensions. By R. K. Durham, Rodney Milling Co., Kansas City, Mo.

An investigation was undertaken to determine, if possible, why oxidizing agents when added to a dough result in improvement in quality and quantity, of bread. While the investigation has thus far fallen short of its original aim, it has at least shown that different wheats and flours respond very differently to oxidation.

A method was worked out for preparing wheat for viscosity measurements. Hydration capacity as determined by viscosity of flour or wheat meal and water suspensions was found to increase when hydrogen peroxide was added. The extent of increase of various types of wheat investigated ranged from 25° MacMichael on Michigan soft wheat to 1400° MacM. on sample of very dark and hard Kansas Winter Wheat. Excluding Durum wheat on which very little work was done, there seems to be a relation between hardness of wheat and increase in viscosity with peroxide.

Increased viscosity of flour and water suspensions upon the addition of peroxide was determined on mill streams. Greatest increase was noted in flour from middlings and least increase in lower grades. For example, 2nd middlings flour showed an increase of 443° MacM. while bran duster flour showed only 45° MacM.

The substance acted upon by peroxide was found to be a water soluble constituent and probably lies toward the center of the berry. Inferior milling results in comparatively low increase with peroxide. It has not been definitely determined why this should be, but it is most likely due to imperfect separation of stocks. There is a possibility, however, that temperature of stocks after grinding may have an effect.

Further investigation is in progress to deter-

mine the part played by peroxide or other oxidizing agents in dough fermentation.

Ash of Wheat and Flour. By C. E. Foster, Hecker-Jones-Jewell Milling Co., New York.

A further study of the possible role of the ash constituents in determining the colloidal behavior of flour doughs is suggested. Attention is called to the significant variations in the composition of the ash from different grades of flour, and from flours produced from different types of wheat.

Hydrogen Ions and Their Application to Mill Control. By H. E. Weaver, Larabee Flour Mills Corp., St. Joseph, Mo.

The hydrogen ion concentration of the wheat received at the mill, the effect of the tempering process, the effect of humidity and temperature, at which the milling process takes place have been studied, to determine their effect on mill products. The treatment of various bleaching agents has also been studied, to determine what effect, if any, they have on the hydrogen ion concentration of mill products.

It was found that the changes occurring in wheat drawn from one territory, are those of different crops and seasons. Selection of wheat will not aid in obtaining control of the hydrogen ion concentration of mill products.

The tempering process using as much as thirty-six hours time effects the hydrogen ion concentration but little.

The effect of humidity and temperature at which the milling operation takes place has not been sufficiently studied to draw any conclusions. The bleaching agents studied show that Novadel and Agene have no effect on the hydrogen ion concentration of flour. Flour bleached with the Alsop Process shows a slight increase.

The use of chlorine increases the hydrogen ion

concentration the most of any of the bleaching agents studied.

The Gluten Quality of Flour and Its Iso-Electric Point. By E. L. Tague, Agr. Exp. Sta., Manhattan, Kansas.

A logical basis for the study and correlation of the different factors influencing gluten quality of flours is proposed. This is the point of minimum transference or neutral point. This point in a mixture corresponds to the iso-electric point in a pure substance.

A method is given by which this point as well as the acidic and basic strength of a given flour can be accurately determined.

Curves are given which show the behavior of different grades of flour, as well as the different constituents of the given flour within the zone (p_H 4.5 to 7) important in gluten formation.

No relationship is apparent between the H-ion concentration of a flour and the point of minimum transference.

The relationship between the period of fermentation and the neutral point as well as other factors influencing gluten formation is being investigated in this laboratory.

Some Variable Factors in Bread Making. By C. G. Harrel, The United Bakeries Corporation, Chicago, Ill.

This subject is important because the factors of bread production are so variable that research workers and laboratories often misinterpret their scientific measurements by a lack of understanding of the principles of bread production. Some of the common variables are: Absorption, Panning and Punching of the Doughs, Pan Greasing, Time, Temperature and Speed of Mixing, anyone of which, if not controlled, will cause great irregularity in the production of good bread.

In my opinion, fermentation is the most important single factor in bread production. To correctly discuss fermentation, doughs must be divided into two classes, straight and sponges, each having very definite characteristics, well known to an expert baker.

The most important factor of flour is its period of production of good bread, called by the baker, the "lee-way" period.

Sponge doughs produce bread with different characteristics from straight doughs, whiteness of crumb, larger volume, etc. This difference it is believed is due to the action of acids as is shown by both viscosity measurements and

buffer values. The buffer value of a dough and those forces tending to overcome this buffer value are two important factors in correct fermentation. Flour is one of the chief factors determining the buffer value of a dough, and its correct fermentation period increases as its buffer value increases. This gives clear flours longer fermentation periods than patent flours, which is in contradiction to the conclusions of many investigators. With flours of the same grade, those having higher buffer values generally have a longer period of good bread production. These latter are the most desirable to the practical baker, as they are the ones that possess the so-called wider "lee-way" period. As the percentage of yeast is increased, the period of good bread production is shortened as shown by the buffer curve of the dough during fermentation. Furthermore, when certain salts which accelerate acid production are added with a constant percentage of yeast, this period of good bread production is likewise shortened.

The Effects of Diastase and Malt Extract in Doughs. By F. A. Collatz and O. C. Racke, The American Diamalt Co., Cincinnati, O.

Three commercial flours of average baking strength were baked with eleven extracts of varying diastatic power. Analysis of the flours showed flour I to have a Lintner value of 14.8° , flour II 17.6° and flour III 18.2° . These values do not agree with results obtained when the flours were autolized using the flour as substrate. Mgms. of Cu_2O produced when 10 gms. of flour were digested 1 hour at $27^\circ C.$ show flours I and III to be about even in diastatic power while flour II is a good deal higher. These figures agree with the analysis of the doughs made from these flours, showing that flour II produced more fermentable sugars than I and III. The addition of diastase to these doughs was not necessary as the diastatic power of the flours was sufficient to take care of the carbohydrate requirements of the yeast. The addition of diastase, in the form of diastatic malt extract, to a dough brings about a good deal of conversion while the dough is being mixed. This is evidenced by a soft, soft and wet or wet and sticky dough depending upon the amounts of diastatic units added. With the increase of added diastase the volume of the resulting bread increases. The expansion or oven lift of flours II and III increases while a decrease is noted in flour I. Color and texture of the bread decreases in direct proportion to the amount of diastase added.

Books for the Baking Laboratory

A SHORT COURSE IN ADVERTISING. By Alex F. Osborn, (Vice-President, Barton Durstine and Osborn, Inc.). Charles Scribner's Sons, 1922, 244 pages, 30 illustrations of advertising.

Our Institute Library has recently been enriched by the acquisition of a number of new books, several of which deal with advertising in its various phases. Osborn's book analyzes and explains the fundamentals of advertising in terms of what to do and how to do it. Himself a nationally known figure in the advertising world, his experience carries the weight of authority as it is crystallized into page after page of illuminating text.

Mac Martin, by way of preface, says of Osborn: "His advertising has helped to turn an unknown brand into a world-leader. In several instances he has helped to nationalize local industries and make possible in five years the progress that would have required twenty years without the electrification of advertising."

This book was written primarily to fit the author's need of a simple yet comprehensive working text for his classes in advertising. The result was so satisfactory that it serves admirably to give us an insight into the "inner workings" of that romantic drama we call advertising. With the after dinner pipe and the easy chair this text becomes a story that is good for two or three comfortable evenings.

References to bread and bakery advertising problems are found in several places, as would be natural in the writings of one who had been active in the development of that industry. For instance, to illustrate the psychology of a bread advertisement: "Here is a nice looking little lad. He seems to be healthy, and reminds me of my sister's boy. He is eating bread and jam, and it says there, 'It's supper-time.' You know, that's a good idea. I have often told Minnie not to let her child eat pork and beans, when the best food is good bread and jam—and Smith's bread is certainly good."

Suggestion, The Motive Power of Advertising, Ways to Win Attention, Preliminary Analysis by the Retail Advertiser, Who and Where Are the Best Prospects, and Analysis of the Consumer's Attitude, are a few of the chapter headings that suggest the wealth of discussions contained under each. Typical national and local campaigns are explained in terms of practical experience as closing chapters. To illustrate the development of character and copy about thirty advertise-

ments of nationally known products of today are contrasted with those of twenty years ago.

By the time the baker has finished the last page he will better understand the potential power of his advertising and will want to read again the paragraphs which he marked for further thought the first time through. L. A. R.

A PRONOUNCING CHEMICAL FORMULA SPELLER AND CONTEST GUIDE. By C. Alfred Jacobson, Prof. of Chemistry, West Virginia University, 279 pp. Williams and Wilkin Co., Baltimore.

When we first saw the descriptive circular announcing the publication of this book, we thought immediately that it ought to be reviewed in *Baking Technology*. Not because it has anything to do with bread or baking but because the readers of this journal are probably all interested in how to spell and pronounce chemical terms correctly.

Here we have some of the chief sesquipedalia verba of chemistry, those jawbreakers so hard to spell, so hard to pronounce, both inorganic and organic, from aluminum to zirconium, acetal to zinc propyl, and not forgetting the minerals from actinolite to zeolite.

In addition, there is a long string of balanced chemical reactions that will excite the ire of some chemists, and the applause of others, especially those who labor in secondary schools and do not worry about the mechanism of reactions and other evils of modern chemistry.

The book will also be a great aid in the solution of chemical cross word puzzles and also in chemical spelling bees.

Dr. Jacobson acknowledges the assistance of a number of well known chemists in the preparation of the book, although he might have called in some of the philologists and etymologists, not entomologists, for a joint conference.

Dr. Samuel Johnson, L.L.D., who was always interested in chemistry, in spite of dictionary making would have rejoiced in this book and wished it well. We do, and we wish we would spell as well as Dr. Jacobson does, therefore we recommend it to all readers of this journal, both chemists and non-chemists.

Cereal chemists will be disappointed, because tritico-nucleic acid is missing from the book, but there are two tables of atomic weights present, one in the text and the other on the last fly and inside back cover.

C. B. Morison.

Abstracts of Technical Articles

Selected for Baking Technology from Chemical Abstracts

Iodine metabolism on normal diet in relation to the prevention of goiter. J. F. McClendon and J. C. Hathaway. *Proc. Soc. Exptl. Biol. Med.* 21, 129 (1923).—The I_2 content of desiccated food from a goitrous region was determined. The results expressed in milligrams per ton are: wheat 1, peeled and cored apples 2.5, oats 10, skim milk 12, spinach 18, and string beans 29. Therefore persons eating much roughage and drinking much milk from herbivorous animals will obtain sufficient I_2 to prevent goiter. C. V. B.

Summary of the activities of the A. O. A. C. for 1924 on studies of methods of analysis of cereal products. Raymond Hertwig. *Cereal Chem.* 2, 46-52 (1925).—Studies were made of moisture, ash, glutenin, sampling and fat in flour. Report of the sub-committee of the A. O. A. C. on the recommendations of the referee of cereal products is given.

Ruth Buchanan.

Wheat and flour studies. III. The amino nitrogen content of the immature wheat kernel and the effect of freezing. P. F. Sharp. *Cereal Chem.* 2, 12-38 (1925); cf. C. A. 18, 2394.—Desiccation is not necessary for the conversion of a part of the amino compounds into the more complex ones; the N distribution of the immature wheat is greatly influenced by different methods of storage and drying. Severe freezing has a pronounced effect on the amino N content of the immature wheat kernel. The percentage of amino N decreases in the normal developing kernel; freezing prevents this decrease and tends to increase the amino N. Results reported should be considered as a report of progress and not as definite conclusions. Ruth Buchanan.

Comments on glycerol as an aid to ashing flour. Raymond Hertwig and L. H. Bailey. *Cereal Chem.* 2, 38-41 (1925).—Details of the method (cf. C. A. 18, 3655) are modified as follows: Use a flat-bottomed ash dish of platinum, porcelain or silica breadth, approximately 5 cm. depth, 1 to 1.5 cm.; an airtight desiccator containing re-ignited quicklime or $CaCl_2$; and a glycerol alcohol solution made from equal volumes of ash-free redistilled glycerol and 95% alcohol by volume. A table shows the results of obtaining ash by this method and the method of the A. O. A. C.

Ruth Buchanan.

Nährzwiebacke and similar bakery products of commerce. C. Baumann, J. Kuhlmann and J. Grossfeld. *Z. Nahr. Genussm.* 48, 436-42 (1924).—"Nährzwieback" is a zwieback containing added ingredients such as milk, fat, sugar and sometimes egg. Determinations made on experimental batches and calculations led to the conclusion that it should contain at least 0.1% CaO (calculated to fat- and sugar-free basis) 8% fat and 15% sugar. Samples from the market were generally below these standards. Samples of cake purporting to contain milk were found so low in CaO that little if any milk could be present. So-called "butter" cakes were believed to be fraudulent since the Reichert-Meissl number of the fat was generally very low. Frank E. Rice.

Nutritive value of wheat. J. L. St. John. *Washington Agricultural Exp. Station Bulletin*, 187, 36-7 (1924).—A study of the effect of Na in a ration composed of purified food material was made. Animals fed no Na or small quantities grew rapidly for a time and then declined, but where large amounts were fed growth progressed normally.

J. J. Skinner.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

of BAKING TECHNOLOGY, published monthly at Chicago, Ill., for June, 1925.

State of Illinois, } ss.
County of Cook, }

Before me, a Notary Public in and for the State and County aforesaid, personally appeared H. E. Barnard, who, having been duly sworn according to law, deposes and says that he is Editor of BAKING TECHNOLOGY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, American Institute of Baking, 1135 Fullerton Ave., Chicago, Ill.

Editor, H. E. Barnard, 1135 Fullerton Ave., Chicago, Ill.

2. That the owners are:

American Institute of Baking, a Corporation formed not for profit,

H. E. Barnard, Manager,

Louis F. Bolser, President, acting for American Bakers Association.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

None.

H. E. BARNARD.

Sworn to and subscribed before me this 15th day of June, 1925.

Rosabelle E. Priddat,
Notary Public.

(Seal)

(My commission expires August 24, 1926.)

Printers' Ink Protects Bread

*A Message Filled with Sound and Practical Advice on
Advertising Bakers' Products*

When the products of flour are criticized because like all foods they do not meet every nutritive need the baker must choose between the alternative of sitting silent, or meeting falsehoods with facts. In years past he has too often felt that "the better part of valor is discretion," but those days are gone. He now resents every criticism of his industry or his products, and willing helpers come to his defense. "Guarding White Bread Against Slanders" is the caption of a fine editorial "Printers' Ink" recently ran. It is full of sound suggestions. Our Trade Promotion Department recommends its careful study.

A WASHINGTON baking concern ran an advertisement recently reproducing an Associated Press dispatch from London to the effect that the British are not eating so much white bread because of a fear that it is probably one of the causes of cancer. The American Baker's Association, regarding this as unfair advertising, persuaded the National Vigilance Committee of the Associated Advertising Clubs of the World to take the matter up with the advertiser. This was done with the result that the copy has not been repeated.

Dr. H. E. Barnard, secretary of the association, in informing Printers' Ink of this action, asks if in our opinion the baking industry can hope for success in its effort to gain protection "from the slanders which are so damaging to the reputation of bakers' bread."

Unquestionably it can if its case has merit, which it of course has. Looking upon the thing from the standpoint of a disinterested observer, it seems to us that the manufacturers of whole wheat bread and other so-called health varieties have been more aggressive advertisers than have the manufacturers of white bread. White bread has been a staple article of food for so long that the trade has come to regard its universal acceptance as a foregone conclusion.

These are highly competitive times. With new products coming on the market all the while, no old and established industry can afford to sit back complacently in the comfortable thought that people will continue using its product just because they always have been using it.

It has been our observation that such advertising as has been done in behalf of white bread has assumed too much. It is dangerous to assume anything these days. The advertising has taken such trends as advising people to eat more bread because it is good for their health. But it has not said why. On the other hand, the makers of competing breads have hammered away on definite talking points. The makers of white bread have been generalizing; the others have been specific.

White bread either is, or is not, beneficial. If it is, then this is a fact that should be impressed by good advertising and not to be left to people's imagination.

Roscoe H. Shaw, chief of the nutrition department of the American Institute of Baking, tells Printers' Ink that cancer is not caused by white bread; that the proteins of whole wheat are less digestible than those of patent flour, and that white bread made with milk will support growth in young animals better than whole wheat bread.

BAKING TECHNOLOGY

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in Baking*



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No. 7

Dividends From Conventions

WILL it pay? Whenever business fails to ask this direct and disturbing question in its analysis of every project presented for its consideration it skirts the pool of adversity. Whenever motives of the heart outweigh the cool calculations of the head, executives build structures which boards of directors later meet to repair and reconstruct. Will it pay? When the founders of the Republic wrote our

Constitution they built well because they asked this definite question of every proposal which later entered into its final draft. And when Amundsen planned his flight across the Polar ice which earned

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it raw. Knowledge must first come to the scientist before it can be applied to the practical every-day concerns of the world and become of benefit to all humanity."

When the first group of bakers met they

for him and his companions full recognition for his splendid failure he asked himself "will it pay" and found his answer in the belief that "To extend human knowledge is always worth while. All we have and are, we owe to scientists, the patient searchers after knowledge." And the explorer pays them this tribute: "Without them we would probably still be killing our meat with stone knives and crunching

came together because they felt such a meeting might pay them for the effort. When the organization which today as American Bakers Association holds a strong leadership throughout the world of the baking industry first met in Boston twenty-eight years ago it brought into conference men who thought that it would pay to work together better than to labor in selfish isolation. And through more than a quarter of a century the men who have set a great industry above the foundations built through the centuries by craftsmen's efforts have worked together, planning, visioning, creating the organization which now functions for the welfare of every baker through American Institute of Baking, and behind their common purpose finding that it does indeed pay to labor for the general good.

And to every baker and every member of the industries which exist because they serve the baking industry as millers of flour, builders of machinery, manufacturers of materials, the coming Convention at Buffalo offers proof beyond question that associations pay real dividends and that the best investment a baker can make is that which earns him recognition as a member of his association.

The Exposition

There will be thousands of bakers at Buffalo, gathered to review the progress of the past year, to find in the conferences new ideas, inspiration and profit, to plan ambitiously for their Association and their Institute. It will be an International meeting for bakers of every country, and in many ways it will be a celebration of the new era which has brought into the industry tireless machines to relieve the arms of men, process control by science instead of by guesswork, the application of business methods in distributing and selling its product.

This week of celebration will be focused

around the Exposition in the 106th Regiment Armory for its great drill hall will be filled with the machinery of progress instead of the weapons of war and its many halls will gather groups for the serious study of special problems which yield but slowly to the men who work alone but which in round table discussions prove easy of solution.

The Convention Plan

The meetings of the convention will emphasize the progress which has been made in developing programs of special interest and in putting sound, hard work into convention days without filling them so full of addresses and meetings that the good they do is minimized by the effort expended in enduring them. The old plan of building a general program of talks by men familiar with different phases of the problems of the baker has been laid aside. It is profitless to require a baker of cake or of pies to endure long hours of debate on some subject of interest only to a bread baker, in the hope that sooner or later he will hear something which will have some application to his particular need. It is wasted effort for an expert on any phase of work to discuss his subject before men who have little interest in it.

The Buffalo plan will bring to the general meetings speakers who will discuss subjects in which every baker has some direct interest and all technical talks will be reserved for group or department meetings. In this way our speakers of national reputation will bring their message to appreciative audiences, and specific problems of fermentation or flour, of organization or sales methods, of education and advertising will be handled by experts speaking before groups who will participate in the discussions and find definite benefits in the debates.

The Buffalo plan is being developed

with much thought and care. It will be built up as a model for convention work. It will fill every hour of the convention week with definite action. And it will give to every guest of the Association, whether member or non-member, baker or salesman, chemist or foreman, the things he most desires, the discussions in which he is most interested, the opportunity he wants for meeting his friends, for attending the dinners of his Alumni group, for studying in intimate detail every interesting feature of the great Exposition.

Of course there is no new thought in the plan of this coming conference. Every idea is an accepted one, tested by many successful conventions of many industries. It does however, offer the baker or allied tradesman who comes to Buffalo a rounded out program which will fill his week with the things in which he has a special interest and relieve him from participation in meetings which have no appeal to him.

The Convention Meetings

The successful baker is no longer a craftsman. His interests are not in his shop but in the position his shop holds in his community. His success is not determined by the work he does at the bench or desk but by the service he renders his customers. And that service is far more than the number of counts of his product. What does the baker mean in the economic life of the Nation? That is the question the alert baker is asking. Herbert Hoover, known to every baker, will give us his idea of the purpose which should impel us to better service.

What is the relation of the wheat farmer, the railroad, the miller, to the baker? That relation is not measured by the value of wheat at the tail of the thresher, by freight rates or by millers' profits but by the service each gives in feeding the nation. William Jardine, Secretary of Agriculture, will show how the baker is

interested in the welfare of the farmer and how the grower of wheat for flour, of hogs and cotton for shortening, of corn for sugars, of barley for yeast, of dairy products for milk and butter can no longer ignore the fact that the baker of bread is his chief helper in the role of feeding the great American family.

How does the medical world think of bread? Is the product of the baker's ovens a food so incomplete as to be condemned or does it in fact serve the hungry world as its staff of life? Can it be improved? Would an increased use of bread benefit humanity? Dr. Morris Fishbein, editor of the Journal of American Medical Association, writer and lecturer, will bring to us the story of bread as it should be understood by the two hundred and fifty thousand doctors who care for our health.

Is the world of womankind interested in bread? Does the modern woman buy bread because she finds it easy to pass the burden of baking day to the baker or because she recognizes the value of the service her baker is giving her family? Why is cake still baked at home? What improvement must the baker make in his methods before he is given the recognition he desires as the first servant of the household?

Mrs. Walter McNab Miller, the able chairman of the Public Welfare Department of the General Federation of Women's Clubs, a leader of more than three million organized, thoughtful women, will tell us why woman has laid her burden on the shoulders of the baker and what she asks from him before she will be wholly content with his products.

These are but a few of the men and women who will bring to the general meetings messages which are of outstanding importance and which will build for the convention a background of earnest

purpose and of our appreciation of the significance of the entry of the baker into the wide field of personal and public service.

The Department Meetings

Every bakery is departmentized. The men who direct the work of each department are trained for their job. The efficiency of each branch is a reflection of the ability of the man who runs it. In the same way our Buffalo Convention will be departmentized. And each section will be managed by an expert. A few months ago the technical group of the industry held a conference of the American Society of Bakery Engineers. It was the most important meeting of the technical men of the industry ever held. For four days the Society discussed the technical problems of the baker. At Buffalo it will hold its third meeting under the leadership of its president, C. J. Patterson, and secretary, Victor Marx. This meeting will be filled with profit to every baker who realizes the fact that he can no longer ignore the role science plays in his shop.

At the Atlantic City Convention last Fall the Trade Promotion Department of the Institute was organized. It has in a short year been of much help to every baker. Its work, although supported by the group which holds membership in American Bakers Association, is of benefit to every baker. The results of its work will be shown by Dr. L. A. Rumsey and its plans for the year ahead will be outlined and discussed. The importance of intelligent advertising and trained salesmanship in enlarging the volume of business is generally appreciated.

What every baker may do to increase his profits through better service is in itself a topic which should make the meet-

ings of the Trade Promotion Department of lasting value.

The branch of the baking industry which manufactures pies is well organized. Its President, Frank Rushton, and Secretary, I. M. Stickney, are planning a program for pie bakers which will draw attention to their outstanding problems and give them information which will lift their business above the flood of criticism which has so often threatened it.

The work of American Institute of Baking in the study of the composition of pies and their nutritive value will be thoroughly discussed and new projects for the benefit of this branch of the industry will be outlined. Many bread bakers may profit by attending the conference on pies.

Cake Bakers' Conference

Cake baking is a distinct art. Housewives say that it is still a household art. But within the last few years the manufacture of cake and its distribution in a wholesale way has made great progress. The baking of cake is as distinctly the business of the baker as the baking of bread. To convince the housewife who still fancies that her cake is better than that from the bakery that she is wrong is too great a task for the individual baker. And so at the Buffalo Convention a special program has been arranged for cake bakers, where they may discuss their difficulties in production and distribution, talk over plans for increasing sales, develop better formulas, tear down and throw away the fences that have been built around the cake baker's domain and let in the light of common knowledge on the baking of cake.

There are no secrets in the modern bakery. The Cake Section of our program will be open to every baker. Out of it will come real benefit to the whole baking industry.

Association Secretaries Meet

A successful baker is trained to his job. He must know what he has to do and how to do it efficiently. The baking industry is developing through organization. Associations, whether local, state or national, function chiefly through their secretaries. Secretarial work is now recognized as a distinct profession. There are definite ways in which to organize, direct and develop association activities just as there are correct methods for controlling fermentation or firing an oven.

The men who are charged with the responsibility of carrying on the work of the scores of baker's associations will have their own place on the program at Buffalo. They will meet to discuss their own work, their method of arousing and sustaining interest in their association, their plans for collecting dues, their activities in interesting health officers, teachers, editors and housewives in the increased use of bakery products. No part of the convention program will be as important to the many secretaries who will go to Buffalo as their own conference.

Indeed It Will Pay

Will it pay to attend the convention at Buffalo? Will the cost of transportation and hotels and the necessary absence from work at home be balanced by the inspiration which will come from a week of sustained interest in the programs of the convention, from the opportunity to study the exhibits and machinery in operation in the great Armory, from the renewing of old friendships and the making of new, from the invigorating vacation in Niagara's mist and thunder, from the satisfaction which will come in playing a part in the most important meeting ever held for and by the bakers of the world?

Every baker will have to balance this account for himself. If he knows how to invest money so that it will work for him

he will make his week at Buffalo the most profitable week of the year. If he weighs as well spent the money he pays for education he will have made his best investment in knowledge when he buys his ticket for Buffalo. If he counts as his own profit the prosperity of his developing industry he will look on his expenditures in association membership as his finest investment and he will find in his 28th annual convention an opportunity to clip rich coupons from the bonds of friendship and of service his interest in American Bakers Association has created.

Early Breads

BARLEY was the first grain used by the ancients in their bread making, but wheat must have come into use soon after barley. Loaves of bread are represented in sculpture and ancient monuments. There were two quite familiar varieties—a small round loaf somewhat like our muffins and an elongated roll sprinkled on top with seeds like the modern Vienna roll. Incidentally, the Vienna roll was introduced into the United States during the war of the rebellion, when a "war bakery" operated in the basement of the United States Capitol turned out products to feed the populace of Washington.

More Toast

Never before have toasted sandwiches been as popular as they are now. A well made and daintily served triple-deck toast sandwich, selling for 30 cents is a popular substitute for the plate lunch of the winter months.

—The American Restaurant.

American Institute of Baking has been of real assistance to us in bringing up the quality of our bread.

—Miller-Parrott Baking Co.

BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

H. E. BARNARD, Editor

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JULY 15, 1925

We Work Together

To win through knowing our markets and developing their full potential possibilities, a higher place for the baking industry in the great family of America's business life.

As Ye Receive, Give

WHEN bakers and their friends visit Niagara Falls and stand before this most beautiful of Nature's works at the time of the annual convention of American Bakers Association in September I would like to have them recall the history of the efforts to conserve unharmed this first Wonder of the World.

It was not many years ago that uplifters and reformers gave America serious attacks of hysterics over the looting of Niagara and in hundreds of speeches and thousands of magazine articles were the men condemned who wanted to utilize the power of Niagara. They were called scoundrels who lust for profit had overcome all sense of social responsibility. To make money they would steal away America's greatest scenic asset.

That was the handicap of every plan to utilize the super power of the Falls at the

beginning, but bakers who go to Buffalo in September can see how it actually worked out. Instead of finding Niagara uglier, they will find it more beautiful than ever. New radiance has been cast over it. It is a radiance that can be turned off or on at the switch of a button. As turned on each night it consists of a battery of searchlights of a billion candle power which are so concealed in the foliage that they in no way mar the scenery, yet they work for hours each night flooding and lighting both the vision of the Falls and the mists above. Think what has been done to accomplish this. Power was taken from the Falls themselves and turned back upon these Falls in the form of light so that Niagara is forced to beautify herself.

Won't you remember this when looking at the Falls and won't you compare in your own mind the results and then think how you may be able to beautify your own bakery and your own industry by returning a part of the profit you receive for each loaf of bread you sell back into the bakery or the industry. The baker is entitled to a profit to himself as each loaf of bread is sold, but let's be reasonable in the division of this profit and by returning part of it back into the bakery we can illuminate our bakery with cleanliness, beauty, and good will, and by turning even a small portion of the profit back into the industry, can make it radiate with consciousness, respect, glorification and brotherly love. It is entirely up to you individually how soon we want this picture developed.

This after all is the real purpose for which we are working. For just as the drops of water rushing over Niagara unite to produce power which moves the wheels of industry in a hundred cities so the coming together of bakers from every state creates a power for the upbuilding of one great association. What a vision to dream.

LEWIS F. BOLSER,
President.

William M. Regan

IT is a privilege to take this opportunity to pay my respects personally to William M. Regan, better known to us all in the baking fraternity as "Bill," who died Saturday, June 27th, at the Eitel Hospital in Minneapolis, after a lingering illness. I am possibly selfish in believing that he might have wished me to speak for and to him at this time.

It is not necessary in these days to live with a man during his entire life in order to know him, understand him, appreciate him, and love him, but it has been my privilege to have known W. M. Regan very intimately during the last fifteen years and during that time I have met him not only as a baker but in his home, as a Rotarian, as an Elk, and as an active worker in many civic movements in Minneapolis.

When I first had the inspiration and aspiration of being a Rotarian, I talked it over with Bill. It was Bill who figured out how my classification should be made in order that I might become a Rotarian, doing this even though we were business competitors from many angles. It was Bill who took my application into the Elks. It was Bill who, when I attended my first meeting of the Board of Directors of the Minneapolis Athletic Club, had a vacant chair beside him and placed his arms around my shoulders and invited me to occupy this seat by him, introduced me to the directors and told me of the workings of the Club.

But Bill, as a fellow baker, is the man that we are going to remember longest. Some twelve years ago Bill took me to my first bakers convention. I remember the big

hall filled with bakers, how lonely I was, knowing no one, wondering what it was all about. It was Bill who came over and held an umbrella over my head and introduced and guided me. It helped me and made it possible to know and have many friends in our industry, in the baking industry that Bill loved so well. Now that Bill has temporarily left us, these same friends that I have known through him are all the more appreciated because he introduced me. The smallest baker in Minneapolis honored and loved him when he was one of the biggest. That is the hardest thing for one man to be in any line. When he was the biggest competitor, the littlest man came to him for help, advice, and encouragement and it was always cheerfully given.

I feel that I knew him well enough to understand that he does not want us to sorrow at his passing, but instead, to carry gladness in our hearts that he was a fellow baker like ourselves. He will want us to advance and carry on his ideals for the baking industry as he understood, believed, and loved them, and we must find our comfort in remembering that we were privileged to have had him for a friend. He was a brother to us all, generous to a fault, sacrificing his time, health, and money for the industry, for you and for me.

To me, my life is fuller, bigger, broader and better for his having been a part of it, and in this statement I believe I speak for every man in the industry. While there must be sorrow at his passing, let there be joy in remembering that he was one of us and a part of us.

LEWIS F. BOLSER,
President.

Rye Bread Flavors

What They Are and How They Are Developed to Please Varying Tastes

By H. E. TURLEY

THERE are more variations in the flavor of rye bread than any other bread sold to the American public. Many nationalities are represented in the United States, all accustomed to eat different types of rye bread. Some people prefer the light colored mild ryes, and in direct contrast to this type of bread, we find, especially in German centers, a preference for the dark sour ryes and with the Swedes, a coarse grained, sweet tasting loaf.

If a baker is starting into business in a community where the people are not well acquainted with rye breads, it will require some experimental work with public tastes to determine the rye best suited to his community.

In order to analyze rye bread flavor we shall have to ask ourselves the questions: Is it the rye flour that gives us the flavor, or is it due to flour blends, ingredients, special dough processes, or special types of cultures used?

Flour blends are a minor factor in the flavor of rye bread for there are many ingredients used by the baker and a variety of processes followed, such as "sour", that greatly offset any flavor produced by a blend of flours.

Black strap molasses is a common rye bread ingredient used by bakers all over the United States. In addition to the characteristic flavor of this ingredient, it imparts a sweetish taste common to the sweet ryes found on the market. Caraway seed has a flavor all its own and if used too freely will cover up other flavors that we may wish to encourage in the particular type of rye we place on the market. In addition to these common ingredients we find many bakers using mint

flavors, and various commercial rye flavors that produce distinctive characters in contrast to bread made with flour, water, sugar, salt and yeast.

The following question is often asked: Why is it that toasted ham and cheese between rye bread is so delicious? The peculiar flavors in the rye bread fulfill the role of condiments in the sandwich and help to satisfy the desire for an extra zest which our palate seeks in the usual mustard or salad dressing. When the appreciative palate has once learned the peculiar satisfaction of the characteristic rye flavor, it is difficult to find any food combination that offers a satisfaction equal to the rye bread sandwich.

The original rye bread was the so-called dark sour rye. The sour ryes were originally made without yeast, but the common practice in America consists of either starting a sour with a piece of old dough, or by the preparation of a sour dough stock, made with rye flour, water, and yeast and allowing it to stand until it turns quite sour. In the sour dough method certain types of acetic and lactic acid bacteria develop, and in addition to the production of organic acids they produce chemical products known as esters. The esters produced during fermentation are an important factor in the flavor of the resulting loaf. A few bakers who are making sour rye bread are securing a more uniform flavor in their product by using lactic and acetic starters, such as vinegar cultures and buttermilk.

Early Rye Breads

The origin of the sour dough method of bread making dates back to the ancient history of the Egyptians and Babylonians.

Egyptian women prepared flour by grinding the grain on a flat stone with the aid of a smaller stone to mash the grain. This crude form of flour was allowed to stand in water for 24 hours, or until it turned sour. This method of bread making was used for centuries by the ancient peoples knowing that the "sour" formed a true leaven, but they did not realize that billions of yeast cells and bacteria were faithfully performing their work in the dough. Quoting from Plinius' Natural History, "It is very evident that the principle which causes dough to rise, is of an acid nature, and it is equally evident that those persons who are dieted upon fermented bread are stronger in body."

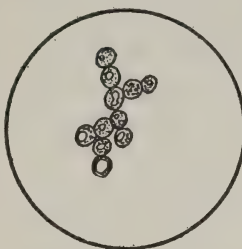
Some of the ancient Egyptians conceived the idea of using fermenting fruit juices in the dough in view of securing a better flavored loaf than was possible with ordinary flour and water. They soon discovered that this fermenting material was useful as a leavening agent.

The general principle of this sour dough method has been used in the various countries through the centuries up to the present day. Bakers in the different countries and in the same country had their own peculiar method of securing a starter of "sour". Some used flour and water, while others used wine, hard cider, the fermenting juice of a palm, or other plant juices, but the general principle remained the same—that of natural fermentation.

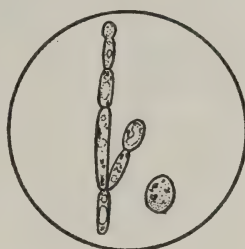
For hundreds of years the "sour" was used without any knowledge of the micro-organisms present. Early investigators paved the way for a comprehensive biological investigation of the micro-organisms of "sours". Emil C. Hansen developed the pure culture yeast method, while Robert Koch developed the plate method for the isolation of micro-organisms. Many early biologists in their crude way studied the yeasts and bacteria found in sour dough, but none of them came to

any agreement relative to the exact organisms that were responsible for definite bread flavors. The early workers on the Biology of "sours" spoke of the yeasts as being yeast a or b or bacterium a or b. They had no method for the classification of the various types of micro-organisms.

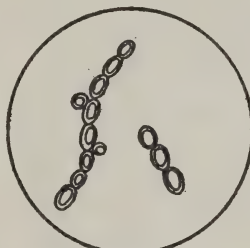
Illustrations below show various micro-organisms found in sours."



SACCHAROMYCES
MINOR



SALSIA
SUAVEOLENS



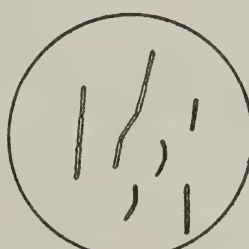
EXIGUUS
YEAST



BACTERIUM
PANIFICANS



BACTERIUM
ACETII



LACTOBACILLUS
DELBRUECKII

Edelsauer and Other Cultures

Dr. Emil Beccard, a chemist and baker of Berlin, gave to the world the most complete investigation of the yeasts and bacteria present in sour rye doughs. The

lack of uniformity in the flavor of sour rye bread in Berlin bakeries prompted Dr. Beccard to undertake these studies. He failed in his attempt to grow the sour dough organisms on artificial media, but he developed a successful method for their cultivation in a sterile bran extract. Dr. Beccard secured a patent on his cultures and gave the culture the name of Edelsauer. Several samples of Edelsauer were submitted to the American Institute of Baking, both for bacteriological examination and trial in a commercial way in our bakery.

In accordance with an article published in Baker's Weekly May 19, 1923, page 49, the culture of Edelsauer is supposed to contain gas producing organisms in addition to the acid producing bacteria. We failed to find any gas producing bacteria in the cultures submitted. This was perhaps due to the age of the cultures, for all 12 bottles of the Edelsauer had been in this country two months after their shipment from Germany. Two acetic acid producing bacteria were isolated from the cultures. One was an unknown organism, while the other one is the common *Bacterium Aceti* found in vinegar generators, and in the manufacture of home-made vinegar. A lactic acid producing bacterium was also isolated from the Edelsauer culture. It is known by the scientific name of *Lactobacillus Delbruckii*. This organism has been used for years in the brewing industry to sour the cereal mashes.

With a knowledge of the organisms present in the culture we were better prepared to culture them in a prepared sour. Nineteen doughs were made up and baked in the School Bakery using a "sour" inoculated with the Edelsauer culture. Rye bread made with the culture was compared with ordinary ryes made up in our shops, such as sweet ryes and several commercial sour rye breads. The bread was

not only examined by members of the Institute staff, but was scored many times **under code** by students in the School of Baking.

Some people do not like the flavor of sour rye breads regardless of how they are prepared, so their opinions were not considered in the score on the flavor of the various rye breads submitted to them. Bread prepared with the Edelsauer cultures scored several points higher on the score of flavor than bread fermented with the ordinary natural sour. The culture rye bread received a slightly higher average score than some of the commercial sour ryes examined, and it stood in equal favor with the best commercial sour rye breads on the market.

How Sours Are Made

The method of preparing the sour from the Edelsauer cultures is given as follows: Four hundred c.c. of water, 100 c.c. of cider vinegar, and 10 c.c. of ethyl alcohol were placed in a beaker. Ten grams of cane sugar, ten grams of commercial milk sugar and the contents of a two-ounce bottle of Edelsauer were then added and the entire mixture was thoroughly stirred before any flour was added. Dark rye flour was blended in equal parts with a patent wheat flour, and a sufficient amount of the blend was added to the above mixture to make the sour have the consistency of a soupy sponge. The sour was started in the morning and placed at a temperature of 80° F. for 24 hours. It was stirred vigorously every two hours during the day and was ready for use the following morning. Due to the fact that the acetic acid bacteria play an important part in the activities of the Edelsauer culture, alcohol was added to the mixture to encourage the growth of these bacteria. In transferring a culture of yeast or bacteria to a new environment any thing that we can do to cater to their needs will be of great benefit, whether we are making bread or man-

ufacturing lactic acid. The acetic acid bacteria oxidize the alcohol to acetic acid. The sour was stirred every two hours in order to incorporate as much air in the preparation as possible. The acetic acid bacteria are great lovers of oxygen. We found that the sour could be successfully refreshed over a period of two weeks, but after that period it was found necessary to start a sour from a new culture.

The amount of sour used in the shop experiments varied from 4 to 14 per cent, based of course upon the total weight of flour used in the dough. In each shop experiment with the Edelsauer, a standard rye dough was prepared as a check against the use of the culture in the dough. The organisms of the culture only produce a mild acidity during the preparation of the sour, so it was found necessary to use from 12 to 14 per cent of the sour to secure a medium sour flavor in the finished loaf. The sour flavor resulting from the use of this culture is a most pleasing one. It is smooth in character and lacks the sharp bite so characteristic of many commercial sour rye breads on the market.

The acidity produced by the bacteria of the Edelsauer culture caused the doughs to mature 30 minutes sooner than the standard doughs. Due to the speedier fermentation of the culture dough, it was found necessary to pay especial attention to the time of the first punch, or the first rising of the dough.

A formula for a very satisfactory Edelsauer rye bread is given in the table below:

Bread Ingredient	Per Cent	Pounds	Ounces
Patent Flour	34	10	..
Clear Flour	33	10	..
White Rye	24.5	7	6
Dark Rye	8.5	2	10
Water	57	16	..
Yeast	2.5	..	12
Salt	2.25	..	11
Caraway	.75	..	3.5
Edelsauer	13	4	4

The use of Edelsauer in rye bread fermentation is what the bacteriologist terms a controlled fermentation. In other words, we attempt to encourage the growth of certain types of bacteria and discourage the growth of others. In the field of fermentation, there are three great types of fermentations, namely: natural, controlled, and pure culture fermentation. If a quantity of apple cider is allowed to stand at room temperature it starts to "work", or ferment by means of the yeasts naturally present on the apple and those that drop into the cider from the air. On the other hand, if that same sample of cider is inoculated with a large quantity of a particular strain of yeast, the superiority of numbers of culture yeasts will dominate the fermentation and we will have what we call a controlled fermentation. If the sample were sterilized and then inoculated with a certain species of yeast one and only one kind of yeast would develop, that is what the bacteriologist terms a pure culture fermentation.

Controlled Fermentations

In rye bread manufacture we cannot sterilize our ingredients so the next best course left open is that of a controlled fermentation. In the building up of a natural sour the baker has no control whatsoever over the types of micro-organisms present in his culture. He may start his bread at the beginning of the week with a new sour, and then at the end of the week he will have an entirely different flavor in his bread. The sour may vary from an acetic fermentation to a lactic, or vice versa. A wild yeast infection may set in and upset his fond dreams of a rye having a pleasing sour taste. Bakers go to much trouble to secure a starter of sour only to find that within a week the character of the sour had changed. Bakers of rye bread all over the world have their own pet sours which they guard very

closely for fear some other baker is going to discover their great secret. They think that Mother Nature has smiled upon them and given them a sour that cannot be equalled anywhere in the world.

The building up of a sour is something any baker can do and it is not a thing of mystery. It is well known that an unpasteurized vinegar contains billions of acetic acid bacteria and that sour milk has a rich flora of lactic acid bacteria. In order to secure what was termed above a controlled fermentation, what is to prevent the baker from using some of nature's own products as a starter for his sours?

In order to build up an acetic sour the inoculating material can be secured by mixing one pint of a good quality of unpasteurized cider vinegar with 4 pints of water. Then cut up a piece of mother of vinegar weighing an ounce into very small bits and add them to the vinegar water. Mother of vinegar is the leathery like coating that appears on the surface of vinegar during its process of manufacture and consists of billions of acetic acid bacteria packed together in a compact mass. Add equal parts of light and dark rye flour to this mixture and build up the sour using the directions given for Edelsauer. The type of sour obtained will depend upon the character of vinegar secured as a starter. The baker using this sour will have to experiment with small batches to determine the proper amount to use in the dough. This culture will remain pure for one week.

In the class of rye sours known as lactic sours there are several types of milk that may be used as the inoculating material, namely: whole milk soured at a temperature of 65° F., whole milk soured at 90° F., culture buttermilk, and a milk that has been soured by an organism known as the Bulgarian bacillus, or known by its scientific name, *Lactobacillus Bulgaricus*.

When milk is soured at a temperature of 65° F. a mild acid type of lactic bacteria dominate the fermentation. These bacteria will develop a sour having a mild, smooth, acid flavor.

When milk is soured at a temperature of 90° F. more of the butyric type of bacteria develop than at the lower temperature, and the resulting milk has a sharp, biting, acid flavor. A sour built up from this milk will also have the same flavor. There is a greater chance of an upset in the fermentation of the dough from using this milk and the flavor of the bread is not as popular as the other types of sour rye breads.

Culture buttermilk can be procured from most of the milk companies as a starter for a sour. Ordinary buttermilk has found favor with a number of bakers who have strayed from the beaten path of natural sours and chance fermentations. Ordinary buttermilk will yield a sour with a pleasing flavor, but will not produce a bread with as uniform a flavor as a culture buttermilk.

Milk soured with the Bulgarian bacillus is sold by a few milk companies, usually under the name of Bulgarlac or some trade name. A sour started with such milk will produce a bread with a very pleasing flavor.

All of the lactic sours can be prepared in 18 hours, and are made up as follows: Dissolve one tablespoonful of commercial milk sugar and one tablespoonful of a highly diastatic malt extract in a pint of water. Add this mixture to a quart of the culture milk and stir thoroughly for two minutes. Blend a good grade of a patent wheat flour with an equal part of dark rye flour and add enough of the flour to the starter to secure the consistency of a slack sponge.

The sour should be stirred twice during the 18 hours of fermentation. All of the lactic sours should ferment at a tempera-

ture of 80° to 86° F., with the exception of the Bulgarian sour which should ferment at 110° F. If the sours have been properly prepared, the use of eight per cent of sour will produce a mild acid flavor, and 12 to 14 per cent will develop a medium to a slightly sharp acid flavor. These sours will keep fresh for one week.

Most bakers who are making sour rye breads are using the sponge dough process. From the standpoint of flavor, we believe that a straight dough process will yield just as good a loaf as when sponge doughs are used. The same types of bacteria develop in each dough, so the end result is the same. If the baker insists upon using the sponge dough method, the sour should always be mixed with the sponge.

The production of sour rye bread gives the baker an opportunity to cater to a varied public taste. It is said that "variety is the spice of life", so a sour rye bread fills that much needed demand for a bread that is just a little bit different. The baker may have to experiment with public tastes, but he will be rewarded for his efforts to place before the public a rye bread with a flavor all its own.

More Bread Better Fed

"It is appalling to find the number of workers who give out because not enough good fuel is put in the furnace to keep the human machine going. Many to make ends meet choose the cheap dishes, regardless of their food values.

"Domestic service and nutrition classes are doing a valiant service now in teaching that a little of the right kind of diet is more nourishing than a quantity that has no food value. But no one has taught this generation the energy-creating dishes or the false economy of beginning work without breakfast, as thousands of factory girls do."

—By Olive A. Colton, in "They or We,"
Scribner's Magazine, May, 1925.

The Case of Dan McQuade

DOES a scientific understanding of what goes on in a batch of dough when it is under fermentation, in the proofer, and in the oven pay the baker? Often we hear that the old rule-of-thumb methods are "good enough for me."

Sometimes bakers await the return of students from the School of Baking in hostility, feeling that they will want to run the shop and overturn sound methods in their first few weeks. But how do these hypothetical fears work out?

The fine little bakery paper, "Crusts and Crumbs" brings us an answer dictated by experience in Portland, Oregon. A picture is shown of a beautiful trophy, —the Harry M. Freer trophy, with its latest winners standing proudly behind it. The trophy was won for consistent and consecutive production of bread of the highest quality.

The man behind the trophy is labelled under the picture with this caption: "Dan McQuade and his chiefs of staff who helped to win the cup, Arnold Meyer, Bill Wilson, Dan himself and H. Guelzow."

To alumni of the School of Baking conducted by the National headquarters of the baking industry for the industry this picture will mean much. For Dan McQuade was one of the early students and one of the most studious and efficient that ever took the course. He had gone from study to production and from production to the top of the production ladder. His victory, in fact, is the spirit of the School in action.

Cooperation Appreciated

We used much of the material you furnished us and built up a talk that was very much enjoyed. We appreciate your fine cooperation and your prompt response to our appeal for help.

—A Rotarian Lecturer.

The Softer Wheats for Bakers

How They Find Their Way Into Crackers and Sweet Goods

By P. E. MINTON

Chief Chemist, the Acme-Evans Co., Indianapolis, Indiana

DO BAKERS suffer some losses from not knowing enough about the wheats that are raised in all parts of America? Sometimes bakers demand a kind of flour that hasn't come out in bulk from the current year's crop. There are many flours and some are excellent for some purposes and far from so good for other purposes.

In the Central States, for instance, are the finest types of soft flours and a few types of hard flours that might be grown elsewhere with possibly better advantages. If you are going to bake crackers it will pay you to know that the Indiana soft wheats are most particularly adapted to cracker producing.

At the present time, there are raised in the Central States a few varieties of hard wheat. The success of hard wheat production in this territory is very doubtful. However, its production brings before the miller of cracker flour one of the problems of wheat selection. He must, in order to make a high uniform quality, eliminate hard wheats or hard wheat mixtures.

There are other factors entering into the selection of his wheat, such as moisture, smut, bin-burn, contamination from garlic and onions, and many others. Also the storage and facilities for handling the wheat are of greatest importance, as wheat that is not properly stored and cared for will get out of condition and no doubt many of you at near the close of a crop season have had experience with musty and deficient flour which the shipper supplied with the best of intention, but through lack of facilities and knowledge

the resulting conditions were brought about. One of the precautions used in most modern plants is the electrically equipped thermometer in the large grain tanks. This instrument permits the miller to find the condition of his stock at any time or at any place in such storage. The selection of wheat is very important for the miller, as you can readily see that it would be possible for him to spoil his product before it was ever ground.

Moisture after Harvest

Excessive moisture in wheat is usually confined to a period shortly after harvest. However, when there is an unusual amount of rainfall during the harvest season, this period of moist wheat extends over a longer period, causing other damage. The miller must be very careful not to let any of this wheat with high moisture content get into his mill. Wheat of this character produces a stringy, clammy flour which is high in acidity. The flour will not age good and will be of inferior quality generally. Naturally, the high acidity is detrimental to cracker doughs. Garlic, onions, mould, must and smut all have a bad effect upon the odor and taste of flour and products therefrom. Bin-burn and like damage are injurious to the gluten and increase the acidity of the flour as well as spoiling the color, odor and taste.

The preparation of wheat for the mill is a most important part of flour milling. Wheat practically always contains a certain amount of foreign material, called dockage, which consists of a multitude of things, from weed seeds to railroad spikes. It is the mission of the cleaning

house in the mill to completely remove all foreign material, dust, dirt and broken grains. The wheat passes through a very intricate system of cleaning and scouring on its way to the rolls. In the larger mills, great quantities of wheat pass through the cleaning house each day, and the equipment used is very extensive. This great outlay of machinery, consisting of magnetic separators, centrifugal dust removers, aspirators, scourers and individual machines for the removal of each of the weed seeds and for the removal of broken and shriveled wheat grains, receives constant attention on the part of the miller and the wheat is whole, pure, sweet and clean when it reaches the mill. It is only the most progressive and highest character of milling firms that can afford this investment and practice these principle to obtain the highest type of uniform quality.

Tempering at the Mill

Then the wheat must be tempered. Tempering consists of laying on a small amount of moisture to the outer coats of the wheat in order that the bran and shorts may be soft and pliable and thus enable the miller to remove them. If these coats were not conditioned, they would grind up and become mixed with the flour which comes from the inner part of the berry. This would increase the protein by the addition of undesirable protein substances, the fat, the crude fibre and the ash, as these substances all lie towards the outside of the berry almost entirely. Tempering differs on the various types of wheat, due to the nature of the bran coats. The miller must put this moisture in the proper place. If the wheat lies too long after being wetted, then the moisture goes to the center of the berry. If not enough time is given it does not penetrate the bran.

I have endeavored to explain the necessity of the greatest care in the selection of the wheat itself, the storage conditioning and cleaning the same, and we now arrive at the point of the actual milling, which I might explain briefly as a series of reductions and separations.

Two Kinds of Mills

Here again the well capitalized and well equipped firm has a distinct advantage. We can separate practically into two methods, milling as it is accomplished to-day. For instance, the up-to-the-minute miller who has sufficient finances does not smash or completely crush the wheat on what is known as the first break, and therefore, make a large amount of what is known as break flour, but on this first break the wheat berry is gently opened, which is followed by a graduated series of breaks until the produce is reduced, in order that a large proportion of the superior part of the wheat called middlings may be obtained.

Reduction and Separation

The reduction and separation in the most modern and best equipped plant is so perfect that, for instance and example, the germ or oil-bearing part of the wheat is removed in its entirety and sold separately, which is an absolute impossibility in what is known as the more cheaply constructed or shorter system mills.

Great care and attention, therefore, is given to what is termed the clean-up. The finer particles of undesirable material are completely removed from the patent quality.

We now come to the point of the various improvements, as it is possible to bring about in the finished flour and in discussing this phase of the situation. I use the sound, well-milled flour resulting from the better type of mill, as already explained, as a basis.

Through the aging of flour in the properly lighted and ventilated warehouse we bring about improvements that are material over the freshly milled product.

There are many processes which are supposed to take the place of this aging, and in the most instances these processes are known to the trade as different forms of bleaching. The cracker baker, in the majority of instances, has preferred to have his flour unbleached or very lightly bleached, as he no doubt found that the bleaching processes originally used did not materially improve, or perhaps in some cases, these older types of bleaching were a detriment rather than an improvement.

However, lately a new process has been installed by some of the most progressive millers and experiments have shown that the process so improves the flour that the flour can be used very soon after milling with even better results than the same flour unbleached and naturally aged for 60 to 90 days, as there seems to have taken place a complete oxidation of color as well as an improvement in the gluten.

Chemists have often marveled at the differences in requirements of various manufacturers of crackers in the way of flour patents. I have experienced cases where manufacturers would get excellent results from a flour of an ash content around .45 and have trouble with a flour from the same wheat with an ash content of .40. I have also known the reverse of this to be true. Investigation seemed to prove that the per cent of patent to be used depended somewhat upon the formula used, the length of sponge, the percentage of shortening and the amount of soda added. Possibly the last was the most important.

Bailey and Johnson have shown in experiments at Minnesota University that the quality of gluten in cracker flours compared very favorably with that of our finest spring wheat bread flours.

The matter of bleaching has already been touched upon in connection with the milling process.

The sweet goods departments of bakeries use a variety of flours. Like the cracker department, they need soft wheat flours. However, due to the use of a different leavening agent, and a difference of character of baked goods, the flours are not necessarily alike. We find a demand for very short patents and also for straight grades, with all the intermediate patents, for this work. The quality of the flour reflects into the baked goods but not to such a marked degree as in the cracker department. Soft flours are wanted, but strength is not at all essential, and is given very little attention. The character of the goods to be produced as well as the price at which they are marketed, usually determines the kind of flour to be used. Then, too, the other ingredients used in sweet goods are given a lot more attention than in crackers.

Milling Precautions

In conclusion, I should like to point out that the milling of high quality flour necessitates greater precautions, manipulations and technique than the milling of flour for any other industry. The better miller is attempting to produce the finest piece of goods adapted to this industry. A hearty co-operation between the miller and manufacturer will expedite the production of the highest quality of goods by the cracker manufacturer as well as by the miller. Necessarily, the miller must know more of the demands, the processes and technicalities of the cracker industry as the evolution of these industries progresses. Both miller and manufacturer are making rapid strides at this time and I believe that it is a sincere wish of all concerned that this progress should continue.

The Composition of Pies

By WM. C. LUCKOW

Technical and Service Department, American Institute of Baking

ANALYTICAL data on the composition of pies is of much importance in connection with nutritional studies of these foods. While various analyses of pie have been reported in the past, such as in Sherman, etc., recent authentic analyses are lacking. We have therefore undertaken an analytical study of the combination of various kinds of pie, which is of considerable interest in relation to the general problem of pie in the diet. The analytical work was performed by the writer and Mr. V. A. Gant, of the Technical and Service Department.

We have been fortunate in securing the cooperation of one of the foremost pie manufacturers in this city who has very kindly furnished us with the samples used in these tests and we wish to extend to this firm our thanks for their hearty cooperation.

The pies used for these tests were the commercial pies ordinarily sold to high class restaurants. Five pies manufactured by this firm were tested. They were peach, apple, raisin, mince, custard and cocoanut. The peach, apple, raisin and mince pies were of the two-crust variety and were baked in pie tins 8 inches in diameter and $\frac{3}{4}$ of an inch high. The custard pie with cocoanut, which was of the single-crust variety, was baked in an 8-inch pie tin 1 inch high. In our work at the Institute we are now making nutrition experiments in order to determine the food value of custard pie. For this work custard pies baked in the ovens of the Institute are being used and as this laboratory has made an analysis of this product, we believe it would be of interest to include it in this report.

Method of Preparing Samples for Analysis

At the start of this work we were somewhat at a loss as to the proper method for the preparation of the samples so that uniform, representative samples might be obtained. Through the courtesy of Mr. W. D. Richardson, Chief Chemist of Swift and Company, Chicago, and with the cooperation of the members of his staff, we were able to dry the pies in their vacuum ovens.

As it is necessary to determine the moisture content of the pies as purchased, we were limited in our ways of handling them, but we finally decided to use the following method of procedure: The combined weight of the pie plus the tin was first determined. The entire pie was transferred to a weighed enameled pan and then the weight of the empty pie tin was determined. From these weights the weight of the pie was obtained. The pie in the weighed enameled dish was then "mushed" between the fingers until a practically homogeneous mass was obtained, care being taken to keep any appreciable amount of the pie from being lost.

The various pies in this condition were then dried in the vacuum oven at a temperature of about 80° C. and a vacuum of about 23 inches until they were judged to be sufficiently dry for grinding. These partially dried pies were then ground by passing them twice through a meat grinder. This ground material after a thorough mixing was placed in jars and used for all the subsequent analyses.

The custard pie used for the nutrition experiments was dried in a different manner. After baking, it was spread out on

a large glass plate and dried by passing a current of heated air over it. When the material had been partially dried it was passed through a meat grinder and then the material, which had the appearance of macaroni, was again spread on the glass plate for further drying in the current of heated air. The process of grinding and drying was repeated until the material became sufficiently dry to fall to a powder. This method of drying worked very successfully with custard pie when no attempt was made to determine the original moisture content. The manipulation would probably have been troublesome had the original moisture content been desired.

Methods of Analysis

Moisture: Moisture was determined from the loss on vacuum drying of the original pie and the further loss upon drying 5 grams of the ground sample to constant weight in a vacuum at 100° C.

Fat: The fat was determined by the tentative method, *Journal A. O. A. C.*, Volume 8, No. 2, page 109.

Ash: The ash was determined by igniting weighed samples of the ground material in an electric muffle furnace at a low red heat.

Protein: The protein was determined by the Gunning method.¹

Crude Fiber: Crude fiber was determined by the method of the A. O. A. C.²

Nitrogen-Free Extract: Nitrogen-free extract, which includes sugar, starch, etc. was determined by difference.

Sodium Chloride: Sodium chloride, or salt, was determined by ashing the sample and then determining the chloride by the Volhard method. In order to avoid a loss of salt, the material was first charred for a short time at a low temperature. The charred material was leached with water and then filtered into a 250 c.c. flask. The

filter paper was returned to the original dish and ignited until white, after which it was dissolved in dilute HNO₃ and added to the original solution in the flask.

Lime: Lime was determined in a solution of the ash by precipitation as calcium oxalate from a solution containing ammonium acetate and acetic acid.³ The calcium oxalate was ignited and weighed as calcium oxide.

Phosphate: The phosphate was determined in a solution of the ash by precipitation as ammonium phosphomolybdate followed by titration with standard alkali.⁴

Starch: Starch was determined as described in the A. O. A. C.⁵ by the diastase method with subsequent acid hydrolysis, except that a stronger diastase solution was used.

Sugars: Reducing sugar and sucrose were determined as described in the A. O. A. C.⁶ with the exception that the further dilution of the solution was necessary because of the large amount of sugar present.

Results

The analyses of the various pies are given in Table I. It will be observed that the results are reported in three ways: (1) as received, (2) air dry, and (3) dry. All of the analytical work, with the exception of the original moisture content was performed on the "air dry", or more correctly, the material as partially dried in the vacuum oven. The values "as received" and "dry" were calculated from the "air dry" results. The custard A. I. B. pie had already been partially dried and as no record had been made of the water lost, it was impossible to report these results "as received". The "calories per pound" were calculated from the analytical data.

¹A. O. A. C. 1920, pp. 283 and 284.

²A. O. A. C. 1920, p. 3.

³A. O. A. C. 1920, p. 95.

⁴A. O. A. C. 1920, pp. 94 and 95.

⁵A. O. A. C. 1920, p. 7.

⁶A. O. A. C. 1920, pp. 97 and 98.

TABLE I

Wt. as Received	PEACH			APPLE			RAISIN			MINCE			CUSTARD WITH COCOANUT			CUSTARD A. I. B.		
	As Received	Air Dry	Dry	As Received	Air Dry	Dry	As Received	Air Dry	Dry	As Received	Air Dry	Dry	As Received	Air Dry	Dry	As Received	Air Dry	Dry
	1076 gm.	1127 gm.	1185 gm.	1127 gm.	1185 gm.	1185 gm.	1185 gm.	1185 gm.	1050 gm.	1050 gm.	917 gm.	917 gm.	917 gm.	917 gm.	917 gm.	917 gm.	917 gm.	917 gm.
Moisture	48.56	1.18	0.00	46.70	2.49	0.00	49.06	1.84	0.00	47.43	1.81	0.00	55.48	3.02	0.00	.....	7.57	0.00
Fat	12.66	24.32	24.61	12.58	23.02	23.61	11.18	21.55	21.95	13.49	25.19	25.65	14.02	30.54	31.49	.....	23.93	25.89
Ash	0.81	1.55	1.57	0.63	1.16	1.19	1.09	2.10	2.14	1.45	2.70	2.75	1.18	2.58	2.67	.....	2.15	2.33
Protein N x 6.25	2.62	5.93	5.09	2.34	4.29	4.40	2.54	4.90	4.99	3.56	6.65	6.77	5.39	11.73	12.09	.....	16.23	17.56
Crude Fiber	0.38	0.73	0.74	0.56	1.02	1.05	0.34	0.65	0.66	0.48	0.90	0.92	0.59	1.28	1.32	.....	0.35	0.38
Nitrogen Free Extract	34.97	67.19	67.99	37.19	68.02	69.75	35.79	68.96	70.26	33.59	62.75	63.91	23.34	50.85	52.43	.....	49.77	53.84
Sodium Chloride	0.40	0.76	0.77	0.29	0.53	0.54	0.50	0.97	0.99	0.71	1.32	1.34	0.54	1.17	1.21	.....	0.47	0.51
Calcium	0.007	0.14	0.14	0.08	0.14	0.15	0.18	0.34	0.35	0.44	0.83	0.84	0.72	1.57	1.62	.....	0.230	0.249
Phosphorus	0.41	0.78	0.79	0.33	0.60	0.62	0.50	0.97	0.98	0.54	1.01	1.03	1.31	2.87	2.95	.....	0.320	0.346
Starch	14.31	27.50	27.83	12.00	21.96	22.52	12.78	24.62	25.08	12.12	22.64	23.06	9.38	20.43	21.07	.....	18.99	20.55
Direct Reducing Sugar as Invert Sugar	5.16	9.92	10.04	11.69	21.38	21.93	18.96	36.54	37.23	14.79	27.62	28.13	1.98	4.32	4.45	.....	5.81	6.29
Sucrose	12.74	24.47	24.76	8.54	15.63	16.03	0.39	0.75	0.76	2.49	4.66	4.75	7.93	17.27	17.81	.....	9.82	10.52
Calories per lb.	1199	2303	2331	1231	2252	2309	1152	2220	2261	1225	2288	2330	1094	2382	2456	.....	2174	2352

For purposes of comparison, the following analyses of pies in Table II are quoted from Sherman's "Food Products", 1924 edition, page 327:

TABLE II

No. of Analyses	Apple Pie		Raisin		Mince		Custard		Cream		Lemon		Squash	
	4		1		3		1		3		1		1	
Moisture	42.5	.....	37.0	41.3	41.3	62.4	62.4	32.0	32.0	47.4	47.4	64.2	64.2	64.2
Fat	9.8	.....	11.3	12.3	12.3	6.3	6.3	11.4	11.4	10.1	10.1	8.4	8.4	8.4
Ash	1.8	.....	1.5	2.5	2.5	1.0	1.0	1.0	1.0	1.5	1.5	1.3	1.3	1.3
Protein N x 6.25	3.1	.....	3.0	5.8	5.8	4.2	4.2	4.4	4.4	3.6	3.6	4.4	4.4	4.4
Crude Fiber	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total Carbohydrates including Fiber	42.8	.....	47.2	38.1	38.1	26.1	26.1	51.2	51.2	37.4	37.4	21.7	21.7	21.7
Calories per pound	1233	.....	1373	1298	1298	800	800	1465	1465	1157	1157	817	817	817

Discussion of Results

The moisture content of the fruit pies, the peach, apple, raisin and mince was practically the same while the moisture content of the custard pie with cocoanut was several per cent higher. Our determinations of moisture are higher than those cited by Sherman. A higher moisture content in pies of the custard type

over those of the fruit type is also noted in the figures cited by Sherman.

The fat content of the various pies was practically the same with the exception of the custard pie with cocoanut which was slightly higher. The fat determination is in general higher than that cited in Sherman.

The pies were practically the same in ash content.

Sherman does not cite figures for crude fiber. The crude fiber was the lowest in the custard and the highest in the custard with cocoanut.

The nitrogen-free extract which includes such items as starch and sugars was practically the same for the fruit pies, but was considerably lower in the custard and the custard with cocoanut. This difference may be partially accounted for by the fact that the custard and custard with cocoanut pies are made with only a single crust.

The fruit pies were nearly alike in their starch content and the custard and custard with cocoanut were somewhat lower.

In total sugar content the four fruit pies are nearly the same while the total sugar content of the custard and custard with cocoanut is about one half as much. The sugar content of the peach, custard and custard with cocoanut consisted mainly of sucrose. In the apple pie the sugar content was made up chiefly of direct reducing sugars which we have calculated to invert sugar. In the raisin and mince pies practically all of the sugar consists of direct reducing sugars which we have calculated as invert sugar.

The calcium content is lowest in the peach and apple and is somewhat higher in the raisin and mince. It is highest in the custard and custard with cocoanut.

The phosphorus content is likewise lowest in the peach and apple, is somewhat higher in the raisin and mince, and is con-

siderably higher in the custard and custard with cocoanut.

On the "as received" basis, the calories per pound as calculated from the analyses are nearly alike in the four fruit pies. The custard and custard with cocoanut had fewer calories per pound on the same basis, but on the dry basis they show higher calories per pound than the fruit pies.

As pies are consumed "as received" therefore most of our comparisons have been made on the "as received" basis, though because of the variation in moisture content this is not always a good method of comparison. For some purposes it would be better to compare the pies on the dry basis or to calculate all of the results to a conventional standard moisture value, but as no standards for pies have been formulated and as pies are consumed "as received", we have made our comparisons on this basis.

Fundamental Facts

"**Q**UITE irrespective of legislative pronouncements in Tennessee or elsewhere, superstitions invented by half civilized men and handed down to us are likely to have doubtful scientific value. When man wants to know the truth he must study nature. There he finds knowledge and understanding that may not accord with his preconceived self-flattering beliefs. Nevertheless, no matter what he thinks about it, he will do well to accept as an axiom that nature knows her own business best."

This clear cut advice to theorists is not our own observation, though it does fit beautifully our thought that our choice of food is determined by natural instinct rather than man made dictum. It is taken from an editorial in the *Herald-Examiner*, and gladly handed on to those who cannot understand why white bread is the prepared food of our great family.

Toast—The Reigning Favorite

WHEN in the depressing days of cheap wheat and discouraged farmers American Institute of Baking started its campaign to popularize toast as a definite way of putting more bread into consumption, it was a question whether or not the plan would succeed. Now after two years, when we see how completely the toasted sandwich has entered the restaurant menu, how generally toasted bread is featured as the basis for cheese and jam advertising, and how Sandwich Shops and Toastettes have invaded the lunch shop districts, we realize that no single campaign for changing food habits has so fully met the fondest hopes of its sponsors.

The American Restaurant, fully appreciating the value of toast appeal during the summer months, gives its readers in the restaurant world this interesting story of the development of this era of good toast and adds some excellent toast suggestions which every baker may successfully pass on.

"Undoubtedly every one has heard the old story about the little girl who was asked by her uncle as to how good a cook she was. And she answered, saying that there was only one thing that she could prepare and that was toast, and she was perfectly capable of toasting bread every bit as well as her mother, in fact, she made it quite clear that her method was identical with that employed by her mother. Naturally the uncle was quite impressed and inquired as to just how her mother and the child toasted bread, and was told that it was very easy, simply place the bread on the toaster and burn it black, afterwards scraping it so that it was edible.

"Now that may seem a little exaggerated but if one will harken back a little

while it won't be hard to recall that not so long ago that was a very common way of preparing toast, not, however, through lack of knowledge as to how it should be done, but because there were no toasters capable of doing it the right way.

"As time goes on every process of food preparation is improved in some way or another and bread toasting came in for its share as well, so that today there are any number of toasters on the market in all styles and capacities, gas and electric, automatic and hand operated. Toast has always been a great breakfast favorite, both in the home and in the restaurant, but with the advent of the improved toasters, restaurants all over the country began boosting toast as a specialty, a lead sales item, if you please, with the result that today it can correctly be classified as one of the 'six best sellers.'

"Of course, the improvement of toasters is not alone to blame, or rather to receive credit for this, there is another reason and while it may be a trifle idealistic we believe it is important enough to warrant consideration, especially by the restaurateur. During the last few months we have mentioned from time to time the very evident change in the public's viewpoint of the food they eat. It has been called cumulative education, and other things as well, whatever it is we do know that the general public is far more particular about the food they eat than ever before and while we are not going to attempt to explain the reasons for this we will offer another warning to the restaurateur who is not already aware of the fact.

"However, that is not the subject, and so let us get back to 'toast,' as we have already said it is a big seller, not only is

it popular as a breakfast item but just as popular during the day, especially as a luncheon item. Sandwiches if made of good materials and served in a palatable way are always popular as a luncheon dish, and to toast them is improving their qualities to such an extent that they can well be used as a special. Not only is toasted bread good in sandwiches but in other ways as well. Therefore, we feel that a few suggestions on using toast would be most acceptable and here they are:

CINNAMON TOAST

Place two ounces of butter in a bowl, add five tablespoons of sugar and one teaspoon of powdered cinnamon. Cream and spread on nicely toasted bread. Be sure to get real cinnamon as a cheaper grade, known as cassia, is not nearly as aromatic and detracts a great deal from the toast.

WELSH RAREBIT

Cut up half a pound of cheese and place in a saucepan with one-half teaspoon of mustard, one teaspoon of grated onion and one tablespoon of Worcestershire sauce. Stir until the mixture is thoroughly mixed and free from lumps and then pour over sliced toast. Serve hot. If desired, the onion and mustard may be omitted.

STRAWBERRY TOAST

Everybody likes strawberries and this dish will find a wide favor. Pick and clean strawberries and add enough sugar to sweeten. Place in just enough water to cover and bring to boiling point. Place toast on plate and cover with strawberries—a simple substitute for shortcake.

CALIFORNIA TOAST

Dip toast in warm cream and place on plate. Cover with a tablespoon of stewed raisins and top with a spoon of whipped cream.

A DELICIOUS SPECIAL

Three slices of toast, each $\frac{3}{8}$ of an inch thick, buttered; small pieces of beef sliced thin forming one layer; and the same of sliced ham forming the other layer; both layers garnished with a slice of pickle and mayonnaise; the whole pressed firmly together and trimmed forming a most delicious sandwich.

Signed for Service

MORE than twenty years ago the need for technical service in the milling and baking industries so impressed Ernest E. Werner, then a chemical and electrical engineer developing the catalytic process for bleaching flour by the decomposition of ammonia into the higher oxides of nitrogen for the Nordyke and Marmon Company, that he equipped and opened a laboratory at Indianapolis in which years in advance of other investigators he studied the application of sound science to the dual problem of the flour miller and baker of bread. In the years since then Dr. Werner has earned for himself recognition through the world of milling as the leading expert on bleaching and maturing processes. He has gained an enviable reputation as a technical director of milling operations. He has served the developing world of the bakery through his studies of flour blending and the relation of chemical factors to flour quality.

And now as the Technical Advisor of the Millers National Federation he brings to the service of the milling industry the ripened knowledge of his rich experience as a scientist, as a legal expert, as a leader in the related fields of the control chemist and the operative miller. It is with a great deal of pleasure that the writer, with the knowledge of his high ability gained through twenty years of joint effort in the cause of pure food and intimate association with him in many problems affecting the quality of bread, welcomes Dr. Werner into the ranks of the technical directors of the food industry. And with a full appreciation of his ability he congratulates the milling industry upon the accession to its ranks of so valiant a champion and so powerful an advocate of every issue which may serve its need as the partner of the baking industry in the all-important task of feeding a hungry world.

Up From The Soil

The Story of Wheat from the Field to the Table as Told in a Volume from The Manhattan Library of the Bank of the Manhattan Company

The greatest story ever told is the story of life itself. And so the story of the Staff of Life as it is so vividly pictured in the third of the volumes of the Manhattan Library will instruct every reader and visualize the work which lies behind the perfected loaf of bread and the processes through which the harvest's golden wheat is transmuted into healthy childhood, honest labor and well-nourished society.

This book, which is the generous contribution of the Bank of the Manhattan Company to its belief that there is need for a wider popular understanding of the problems confronting wheat farming and its related industries, should carry this wonderful story of the newest and most important industry to the millions to whom bread is the best and cheapest food. And so Baking Technology, through the courtesy of the publishers, will reprint it in serial form.

PREFACE

NOTHING can be more basic than the processes that give us the bread we eat, and the inspiring story of social co-operation, which is involved, contains some elements that are unfamiliar to the general public.

The problems of millions of wheat growers are of hardly less concern to city dwellers than to the producers themselves. It is vital that they be understood. Transportation, milling, baking, merchandising and the mechanical devices through which both these and farming have evolved into their present form and scale, all assume new significance when brought into their proper relations while back of them is seen the great stream of human development to which each contributes.

The Bank of the Manhattan Company, since its founding in 1799, has witnessed the remarkable sequence of events which has made America "the bread basket of the world." Being thus in a peculiarly favorable position to speak with a degree of first-hand knowledge, it has recognized its responsibility to aid in disseminating,

in popular form, an understanding of America's economic structure.

Chapter One

WHAT BREAD MEANS

EVERYBODY knows bread — or thinks he does; yet how few people realize what a fascinating story lies behind that commonest of all foods! Woven through this story are the strivings, sufferings and achievements of all humanity in all the ages. The sciences, arts and industries of all the peoples of the earth have their parts in it. Agriculture, commerce, invention and mechanics make to it some of their choicest contributions.

Beyond the slice of snowy bread imagination's eye may see pictures of primeval man raking seed into the soil with a stick; caravans of camels striding along the skyline of history; reapers wearily swinging their scythes through the field of wheat; the old grist-mill with its splashing water-wheel; the busy mother baking in the family kitchen; ships and wagon trains carrying their life-giving treasure across

seas and continents and many scenes besides.

All this is the merest suggestion of what bread means.

Until we know that bread is "the staff of life," not alone of the human body but of all our vast social structure and economic system as well, we cannot know bread at all.

Who can ever forget the cry for bread which went up during the World War when millions were brought suddenly face to face with a realization of what it might mean to go without it?

In an almost unparalleled degree, bread has shaped the history of the world. It inspired the pioneer spirit which brought about the development of our own States and that of Canada, Australia and Argentina.

The story of bread, could it be fully told, would make the mightiest of world epics, vibrant with the romance and swift-moving drama of human life from its beginning.

Do we know the bloody wars that have been fought for bread, and lost for lack of it, and count in history the nations that have beaten their plowshares into swords and so perished?

Do we know the romance of inventions that have multiplied the farmer's, the miller's and the baker's power of labor through machinery?

Do we know the romance of transportation that has annihilated distance and brought the whole of humankind into one community, with the possibility of providing bread in plenty for all?

Do we know the romance of the natural sciences that are penetrating the mysteries of nature and extending man's mastery over her forces, and of the social sciences that are giving man an understanding of himself and of the multiform relationships that knit modern society into a unity of interests?

All these things, and many more are implied in the story of bread, for bread is a symbol of human understanding, interchange and mutual dependence.

Drawn together into each loaf are not only the food elements that have been painstakingly assembled, but also the thought and labors of an unseen army of farmers, manufacturers, railroad men, millers, bakers and others uniting their efforts in the vast voluntary co-operation of modern society. Thus closely bound together are all the factors of business prosperity and social progress, making it essential that there be forbearance, sound counsel, mutual understanding and co-operation on the part of every element of our citizenry.

Let any group or "bloc" lose its sense of the whole in order to seek for itself disproportionate advantage without reference to the effect on the others and disaster ensues; orderly government, the safeguard of human society, is imperilled and the welfare of even the self-seeking element disappears in the danger that comes to all.

Chapter Two

THE SEED OF CIVILIZATION

THE beginning of our story is in the brown earth, over which the sprouting grain spreads a haze of early green, changing soon to the thickly set stalks and golden heads of harvest time. There, upon millions of acres, under the ripening sun of summer, is first to be found our bread. Mills and bakeries must stand idle and men go hungry unless in the beginning the ancient partnership of the farmer with Nature fulfills its mission.

Civilization had its birth in the cultivation of the soil. As it came to be realized that man could assure his own food supply by planting grain, wandering tribes ceased to depend on the pursuit of

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game and settled down in fixed places. Thus the home was set up, people began to be aware that they had common interests and the foundation of progress was laid. From this remote beginning have developed the complicated modern relations of human society.

History tells much of kings and wars, but the common man it leaves obscure for the most part in the drudgery and darkness of antiquity. For thousands of years his status was little above that of the brute creatures with which he shared yoke and grain. Nature was closer and kinder to him than were his fellow men. Nature, he saw, acted under fixed laws, and sun, soil, rain and seed all worked together in the growth of his grain. But of like laws in human relations he knew little. Every man was for himself, with all others against him.

Ages passed, and progress came in in its broadest aspect and in a double sense it may well be characterized as the seed of civilization.

Among the most ancient monuments in the world is one of the wheat farmer. It was only recently discovered at Locmariaquer in France where it was erected by a prehistoric race. Five thousand years ago, the Chinese called wheat "a gift from Heaven." And, indeed, wheat is worthy of all this honor. Its important constituent, gluten, which makes it the grain best adapted to the baking of leavened bread, the wide variety of conditions under which it may be grown, and its superior keeping qualities, have caused it to be a mainstay of existence. Hence it has accompanied man in his migrations throughout every continent. The question of famine or plenty has been largely dependent upon the wheat crop.

The primitive man who planted seed after scratching the earth with a stick and was fortunate if it returned enough to feed his family, is strikingly in contrast

with the modern farmer who mixes science with his soil, sows, reaps and threshes by the magic of machinery, and pours a many-fold increase into the out-held hand of the world in exchange for comforts unknown to an earlier generation.

Cultivation of the soil has marvelously improved in method and product; and more richly productive still has been its effect upon the mind of mankind. Over conditions that for centuries enslaved him in poorly rewarded toil, man assuredly is becoming master. In the same degree as he has learned the fixed laws of Nature which act upon the seed in its soil-bed, and has worked with them, his yield has increased in quantity and quality. He is discovering, too, that there are great laws affecting human relationships, and that, as he learns these laws and adjusts himself to them, he makes possible a future harvest of social welfare.

In the modern growing, transporting, milling, baking and consuming of the world's wheat, there work together many industrial, commercial and financial units, diverse but interrelated, in the great common cause of the nourishment and development of the human race.

"Give us this day our daily bread" is still the universal human appeal, still the urge to progress in every land.

(To be continued)

A Suitable Gift

"My nephew has just graduated from high school and in looking around to give him a graduation present, we declared that we could give him nothing better than a trip to your School of Baking at Chicago. So we handed him the ticket and a check for his expenses knowing that what you have to show him will give him a vision of the baking industry quite different from that he has seen in his work in the shop."

White Bread and Brown

By WINIFRED STUART GIBBS

THE equally high merit of breads made from whole wheat flours and from the refined or patent flours are steadily though still too slowly being recognized by layman and scientists.

Over a hundred years ago Dr. Graham started the argument when he milled the flour which ever since has borne his name. And in those early days when crude milling practices were the only ones in use, his followers reviled the whiter flours in exactly the same bitter and inaccurate phrases that the most modern of the advocates of the whole wheat theory of life so vigorously and so unjustifiably uses to-day.

And now let Winifred Stuart Gibbs, writing for the McClure Newspaper Syndicate, continue the story.

"Dr. Graham of sainted memory may, in the expressive if inelegant phrase of the day, be said to have 'started something' when he opened the discussion on the subject of brown vs. refined flours.

"Our ancestors of pioneer times were often, no doubt, glad to get bread itself and were not 'fussy' as to its exact hue. Before the days of multiplied requirements and expenditures home baked corn bread must have been, perforce, the standby of most housewives. As luxuries and comforts multiplied wheaten bread came to take an important place in the dietary and this was all to the good of the race. Wheat has a richer mineral content than corn and is far more easily converted into porous and digestible breads. As this period developed, however, there were not wanting those who raised dissenting voices when white flour came up for consideration, and Dr. Graham was prominent among the members of this group.

"Loud and long did its advocates proclaim the doctrine of dark flours made from whole grains, and following the fad-dists came our group of scholarly scientists, many of these also being on the side of unbolted flours. Arrayed in the opposite camp were individuals, also scholarly, also scientific, who stoutly maintained that because of its more complete absorption white bread actually nourished the body better than brown. The distracted layman has for some time compromised by determining to partake of reasonable quantities of various types of breads, letting individual age, circumstances and digestive capabilities decide.

"The interesting part of all this is the fact that both sides in the discussion have had real talking points! Unquestionably, judged by coldly impersonal chemistry, unbolted flour carries off the palm. In the case of almost all grains the germ holds the major portion of the valuable mineral salts. On the other hand, the leaders who have held to the view that white flour was more digestible could point to the incontrovertible fact that because of the roughage present in whole grains they might easily prove irritating to delicate stomachs. Certainly, the lack of porous 'lightness' in many varieties of brown bread makes them 'a load' for a tired digestive system to assume.

"So, the aforesaid layman, stirring conscientiously to do his whole duty by his body and consequently by his spirit, has experimented with his own capabilities. Always, however, there has been the lurking feeling that under ideal conditions we should eat whole grain breads. Then presto! At least so far as the layman

knows, the case for white flour is vindicated!

"A famous British scientist has established apparently beyond question, that in spite of the fact that white flour contains less lime, the bone-making element par excellence, than flour from whole wheat, has a more beneficial effect on teeth and bones than flour made from the whole grain.

"Why is this the case? Exactly, why? Nature knows, but she has not as yet disclosed this particular secret to the scientists. That he will ultimately dig up the information goes without saying, for modern dietetics is a fascinating science and has many faithful and efficient followers. Meantime, however, those of us who never did like brown bread, anyway, who long sometimes for a slice of white bread and butter as we hope for salvation may take heart of grace and eat it!

"All progress," says Lafayette Mendel, 'postulates change'—change of theories, of plans and activities. To change our ideas regarding white flour in accordance with the development of knowledge is to show ourselves true scientists."

The Real Staff of Life

WHEN a former Health Commissioner of our largest city and a Senator of the United States calls bread "the real staff of life," his opinion has both weight and merit. Writing for the Minneapolis Tribune, Dr. Royal S. Copeland pays interesting and generous tribute to the product of the modern bakery.

"One of the gratifying improvements of the generation is the betterment in the loaf of bread. I attended a convention of bread bakers a few days ago and what I heard there was a joyful revelation.

"The way bread is marketed now, in a wrapped package, makes for cleanliness and good health. It goes against the

grain to see any foodstuffs exposed to weather, dust and handling. But while it is unpleasant to think of such contamination, cooking will kill the germs and render such food incapable of producing disease.

"When it comes to bread, we have an entirely different condition. We eat bread as we buy it. If it is not clean when it is purchased, it is not clean when it is eaten.

"For these reasons the wrapped loaf is a blessing. It keeps the surface of the bread from becoming soiled and contaminated.

Milk Adds to Value

"A popular modern method for making bread in the commercial bakeries is to add milk to the mixture. One has but to consider the valuable ingredients of milk to realize what important properties are added in this way.

"As you know, milk is rich in the essential chemicals, so when it is added to the mixture, the bread possesses all the desirable qualities.

"There are flours which are better suited for cakes than for bread. But when the flour is well made and especially when it is reinforced with the milk, the bread baked from it is sure to be wholesome and nourishing.

Is Real Staff of Life

"There is no questioning the old saying that 'bread is the staff of life.' With good butter spread upon it and a glass of milk to wash it down, you have the choicest food the world can give. Your bones, muscles, brain and blood will be nourished and sustained if you eat these simple things.

"There are many kinds of bread. You can have graham, brown, rye, whole wheat, raisin bread and other forms to suit your every whim.

"Find a suitable brand of bread and leave an order for regular delivery. This is the foundation of the feeding problem."

Science in Mill and Bakery

More Abstracts of Imported Papers Given Before the American Association of Cereal Chemists

The need for standardized methods and equipment was emphasized by several authors in papers read at the St. Louis Convention.

The application of colloid chemistry to the work of milling and baking chemists and the value of viscosity studies was discussed at length. Abstracts of these papers are printed herewith by arrangement with the editors of Cereal Chemistry.

Science in Experimental Baking. By C. B. Kress, Sperry Flour Co., Stockton, Calif.

The baking formula should include only the essential ingredients. Shortening should be omitted. Yeast and sugar should be used in about the proportion of three per cent of the flour, and salt about two per cent. Absorption may be conveniently determined in the process of mixing the dough for the baking test. Progress of fermentation may be followed with methyl red indicator, or a mixture of methyl red and brom-cresol purple. Control of temperature of the dough is essential.

A 16 oz. loaf, baked in a pan $3\frac{1}{8} \times 9\frac{1}{4}$ inches in horizontal section at the bottom, $3\frac{3}{8} \times 9$ inches at the top, and $3\frac{3}{4}$ inches deep affords the most satisfactory index of the baking qualities of flours undergoing examination. Crust color affords an indication of relative diastatic activity, or pale crust indicating low diastatic power.

Science in the Mill. By P. H. Lawson, The Kansas Flour Mills Co., Kansas City, Mo.

The importance of the personality of the chemist is emphasized. The ability of the chemist to work on good terms with the miller must be considered along with his accuracy as an analyst. Collaborative testing of samples, and the development of standard methods is apparently resulting in more uniform work by different chemists.

Chemists should become familiar with the demands of the trade of the mill which employs them. The laboratory should counsel in the purchasing and blending of wheat. The blending should be based on the results of baking tests, as well as chemical and other tests. Crude gluten (or protein) and viscosity tests are not adequate. Moisture testing of the cleaned wheat aids in the control of tempering. Finally, it is suggested that the mill superintendent of the future will be familiar with chemistry, as well as the engineering aspects of his profession.

Recent Developments in the Studies of the Physico-Chemical Properties of the Gluten Proteins. By C. H. Bailey, Biscuit & Cracker Mfr's Assoc., Chicago, Ill.

Attention is called to the recent investigations of Cross and Swain, Hoffman and Gortner, Blish and Pinckney, Dingwall, Halton, Tague and others respecting the physico-chemical properties of gliadin and glutenin. The evidence available seems to indicate that gliadin preparations from different varieties of wheat and from different species of the genus *Triticum* possess similar properties while glutenins from the same sources may be variable in certain particulars. No evidence is yet available, however, which indicates that variations in the properties of different glutenin preparations may be attributed to differences in the chemical constitution of the glutenin molecule. Such differences as exist appear to be due to variations in the size or dimensions of the colloidal aggregates, which variations are reflected in the observed differences in colloidal behavior.

A Standard Baking Procedure for Flour Mill Laboratories. By Walter J. Rogers, The Weber Flour Mills Corporation, Salina, Kans.

Questionnaires answered by members of the Kansas Chemists Club afforded a working basis for the trial formulas and procedures, to be experimented upon in each laboratory.

Percentage of ingredients in each member's laboratory formula showed some high, some low, and some consistently near the average.

An average formula selected showing percentage of ingredients based upon the amount of flour charge, showed the suggested formula outstanding in that five of seven best loaves chosen out of some fifty baked samples, were baked from the trial formula.

The size of pans differed in nearly every laboratory to such an extent that a factor of 4.6 was used by each chemist to find the amount

of flour charge by dividing the pan volume in cc. by this factor arbitrarily assumed to meet the average pans.

The commercial one pound and one and one half pounds sizes of pans were used to experiment upon to find the most popular size pan desired. A one and one quarter pound pan met with favorable comment but after experimenting with it, a twenty-one ounce pan was chosen for the next experiment.

Two formulas were tried with only a difference between the yeast and salt contents, the smaller amounts of each chosen for the economical viewpoint.

The experience of our members with these pans and formulas leads us to believe that a possible solution to our laboratory baking variations can be found in the adoption of a formula and baking procedure which under ordinary laboratory conditions can be carried out by any number of analysts to secure a uniform baked loaf of bread from the same sample of flour.

Viscosity Studies with Nebraska Wheat Flours.

By M. J. Blish and R. M. Sandstedt, Dept. of Agricultural Chemistry, University of Nebraska, Lincoln.

During the past few years, the viscosimetric procedure of Sharp and Gortner has aroused great interest among cereal chemists, from the standpoint of the possibility of practically applying this procedure to routine estimations of gluten quality in wheat flours.

More than 100 samples of Nebraska wheats collected during the season of 1922 were experimentally milled and baked. The actual viscosities of their respective acidified water suspensions (all at identical conditions of flour concentration and acidity), both with and without preliminary removal of electrolytes, were determined, using the MacMichael viscosimeter. Their respective protein contents were determined. Loaf volume was used to represent baking strength. Using the statistical method, coefficients of correlation were computed for loaf volume and each of the following factors respectively: actual viscosity without removal of electrolytes, actual viscosity with preliminary leaching out of electrolytes, ratio of viscosity to protein content, both with and without previous removal of electrolytes, and total flour protein. The correlation between viscosity and protein content was also computed.

There was a decided positive correlation between loaf volume and protein content, although it was rather low. A positive correlation of the

same order between actual viscosity (without preliminary removal of electrolytes) and loaf volume was found. There was a slight positive, but lower correlation between loaf volume and actual viscosity after removal of electrolytes. There was little or no positive correlation between loaf volume and ratio of actual viscosity to protein content. There was a rather high positive correlation between actual viscosity and protein content. Therefore, for this series of flours, protein content would have been as valuable a basis for predicting baking strength as would have been a knowledge of actual viscosity. The factor of protein quantity apparently had more effect on actual viscosity than did protein quality, in so far as loaf volume is a fair criterion of protein quality in these experiments.

Constant "b" suggested by Gortner as a measure of gluten quality was determined for each of 19 flours, following Gortner's specified procedure in each detail. Diastatic value and amount of glutenin were also determined for each of these flours. Even among flours of similar protein content, no useful relationship between constant "b" and loaf volume was found. This could not be explained on the basis of either glutenin content or diastatic value. The ratio of total protein to glutenin content was apparently remarkably constant.

It was concluded that

No generally known viscosimetric procedure has yet been perfected by means of which gluten strengths of Nebraska wheat flours may be predicted with reasonable accuracy, and that

There may be some important factor aside from gluten quality, as measured by viscosimetric methods—glutenin content, or diastatic value which determines baking strength in Nebraska wheat flours.

It is felt by the writers that the influence of many factors, both known and unknown, on viscosity determinations with acidified flour-in-water suspensions must be more thoroughly understood, before the procedure may be modified in such a way that it will serve as a rapid, useful and universal means of estimating flour strength.

Methods of Determining Loaf Volume. By W. O. Whitcomb, Agr. Experiment Station, Bozeman, Montana.

The various methods used in measuring loaf volume are described. Displacement of seed offers advantages over the other methods.

Books for the Baking Laboratory

LOOKING FORWARD. By Sir Charles F. Higham. 201 pages. Alfred A. Knopf, Publisher, New York, 1920.

Sir Charles F. Higham, knighted for his service to England during the War as publicity director for the government, has recently come before the American public again as he loosens the purse strings of a million dollar advertising campaign in favor of India Tea. Whether we become a nation of tea drinkers is a question still debated in serious or humorous vein in the editorial columns of the press, but the advertising copy appearing in our newspapers does carry a variety of simple and effective appeals for the slice of toast and a cup of India Tea in mid-afternoon.

Sir Charles has the faculty of looking forward and his utterances mark him as ambassador extraordinary for that future day when our national ideas or personal responsibilities to serve our fellowman shall be fostered by enlightened publicity.

In a recent radio address on the opening of the Chicago Campaign for India Tea, he was heard to prophesy that the time is not many years away when we shall see the philanthropy of the "three wise, rich men" take the form of full page advertising on the virtues of moral integrity and personal service. He said the power of white space and printer's ink would soon become too precious to carry the selfish single brand appeal.

So it is significant to see our great American corporations already using their paid space to argue the advantages of practical education, as is being done by the Westinghouse Electrical Company and the Metropolitan Life Insurance Company.

It is seldom that we have the good fortune to come across a book so fundamental in subject, so profound in its exposition of the art of "Making Known" and so clearly written that it can create a mental background against which to judge the merit of our other new books, as is the case with "Looking Forward."

Taken at random, a few brief quotations only are needed to create a desire to read the book through.

"Much of the suffering of humanity is due to ignorance." "So much of this blindness and its attendant misery is preventable. Is there no way by which knowledge can be given to the million in a cheap, easily digested, lively and dramatic

form?" "This can only be done effectually by continual announcements in the advertising columns of the newspapers, because this is the only medium which reaches every class of home and every type of mind. It eliminates editorial interpretation, which can so easily distort and delicately camouflage; and the result is instantaneous because the news is so far flung, so easily digested, and so impossible to overlook."

If one would realize the vast power of organized publicity, the potentialities of emotional appeal in advertising, read as a companion to the other books on advertising this work of Charles F. Higham, "Looking Forward."

L. A. R.

Abstracts of Technical Articles Selected for Baking Technology from Chemical Abstracts

Calcium and phosphorus metabolism in osteomalacia. L. M. Miles and Chih-tung Feng. J. Exptl. Med. 41, 137-57 (1925).—Osteomalacia is a diet deficiency disease of the same category as rickets. The deficiency is principally in the fat-soluble vitamin content of the diet, though there may be a Ca deficiency at the same time. The disease may be prevented by providing a diet rich in the fat-soluble vitamin content and may be cured by adding the same to the diet.

C. J. West.

Production of hydrogen sulfide by yeast. C. B. Morison. Science 60, 482-3 (1924).—The production of H₂S by the fermentation industries is not new. In this paper is reported the production of H₂S in fermenting mixtures of normally appearing wheat flour and water by means of yeast. If HCl were added to the water in making the dough, no H₂S could be detected, but a mixture of S-free Zn and HCl added to the flour produced H₂S. The identity of the S. compound in the flour has not been determined. The S may originate in S compounds absorbed by the flour during fungiation. The problem is still under investigation.

L. W. Riggs.

Yeast food for bread-making. G. R. Potts. U. S. 1,509,175, Sept. 23. A mixture composed of malt syrup, extract of hops and maltose syrup is used.

Cereal chemistry and the flour industry. R. G. Lapsley. *Mining Rev.* 16, 490-3 (1924).—Weaknesses and shortcomings of cereal chemistry are given. The application of biochemical principles to the bakeshop are rapidly doing away with guess work in the bakery. Perplexing problems regarding yeast and yeast fermentation have been solved, also ropiness in bread.
Ruth Buchanan.

Dietary requirements for reproduction. III.

The existence of the reproductive dietary complex (vitamin E) in the ethereal extracts of yellow corn, wheat embryo and hempseed. Barnett Sure, J. Biol. Chem. 62, 371-96 (1924).—Skimmed milk powder constituting 50 per cent of the ration, furnishes amino acids and of excellent quality sufficient in quantity for the normal reproduction of rats and, when fortified by the addition of 0.2 per cent ferric citrate, furnishes sufficient mineral elements of excellent quality. Much more vitamin B is required for normal lactation than for growth. But even with the addition of considerable quantities of yeast vitamin to a diet of skimmed milk, dextrin, salts and agar, normal reproduction was not obtained until some of the dextrin had been substituted by the addition, wheat germ or hempseed. Com-the addition, to constitute 5 per cent of the ration, of the oil extracted by Et₂O from yellow wheat germ or hempseed. Commercial cottonseed oil and commercial olive oil were also effective, but commercial coconut, linseed and sesame oils were not. Cf. C. A. 18, 1849.
I. Greenwald.

A study of cracker-dough fermentation. A. H. Johnson and C. H. Bailey. *Cereal Chem.* 1, 327-409 (1924).—A very complete report of the result of a chemical and physical examination of crackers collected from various factories in the United States, of the flours used in the cracker industry and of the different stages in the process of fermentation of cracker doughs and sponge is given. Numerous graphs and tables are given. The significance of the results is mentioned.

Ruth Buchanan.

Carbon dioxide diffusion rate of wheat-flour doughs as a measure of fermentation period. C. H. Bailey and A. H. Johnson. *Cereal Chem.* 1, 293-304 (1924).—Two devices are described for conveniently measuring the rate of loss of CO₂ from fermenting doughs.

Ruth Buchanan.

Vitamins up to date (1924). W. D. Richardson. *Inst. Margarine Mfgs., Bull.* 7, 15 pp. (1924.)
E. J. C.

The identity of gluten proteins from various wheat flours. M. J. Blish and A. J. Pinckney. *Cereal Chem.* 1, 309-16 (1924).—Seven samples of pure glutenins from widely different types and varieties of American wheats were examined with respect to their respective racemization rates in alkaline solutions in order to discover possible differences in chemical configuration. Six of the seven samples were found to be identical. A sample of Polish wheat of extremely low baking value differed from the others. Three samples of pure gliadin were examined by the same methods as were used with the glutenins. Polish wheat differed slightly from the other two. It is highly improbable that variations in the respective flour strengths of commercially important wheats can ever be attributed to differences in the chemical configuration of their respective glutenin molecules.
Ruth Buchanan.

A practical application of the viscometer to the mill. R. W. Morgan. *Cereal Chem.* 1, 288-92 (1924).—Most flours show greater variation in viscosity than in any other analytical tests. Good flours have high viscosities, poor flours low viscosities. The viscometer quickly and surely points out real quality in both wheat and flours.
Ruth Buchanan.

A chemical study of the development of the wheat grain. H. E. Woodman and F. L. Engledow. *J. Agr. Sci.* 14, 563-86 (1924).—A study of the manner in which the individual wheat proteins are developed and stored during the progress of the grain from the early stages after flowering to ripeness. "The immediate object of the investigation was to secure information in regard to the stages at which the different proteins made their appearance in the grain and to determine at what point the character of the grain contents was such as to enable a tenacious gluten to be obtained by grinding up the kernels with successive quantities of dilute NaCl and to attempt to elucidate the relationships which exist between the simple and complex forms of N at the various stages." The quantitative changes in the moisture, crude fat, crude fiber and inorganic constituents and acidity of the aqueous extracts were studied. The technic of the methods of analysis compels one to consult the original.

R. B. Deemer.

Sound Editorial Logic

IN the course of routine copy writing the amazing story of Sir W. Arbuthnot Lane's prescription for the prevention of cancer crept into the news columns of the *Fairfield Daily Ledger*. It hurt the feelings of Paul Coleson, the baker who makes good white bread for Fairfield citizens, and he asked Roscoe Hart Shaw of the Nutrition Laboratories of the Institute to set the editor right.

So Mr. Shaw sent on some authentic information, including Dr. E. V. McCollum's article on Bread published in *Baking Technology* for June. The editor printed that fine appreciation of white bread and then wrote a splendid editorial which we gladly reprint and which may well be used by every baker who has been worried by the horrid tales which come across the Atlantic to disturb our appetites.

"Henry Ford, who lives up in Dearborn, Michigan, and makes a low-priced automobile that is guaranteed to take you there and get you back, prints in the current issue of his magazine, the *Dearborn Independent*, a statement by Sir W. Arbuthnot Lane, to the effect that white bread is a deadly weapon and that he who would avoid cancer had better shun it as he would a pestilence. He thinks one ought to use whole wheat bread and leave off meat and take to vegetables. He gives it as his opinion that if a man would do all this, he need have no fear of cancer, which has become the most dreaded of maladies.

Somehow, when we consider the statements of our friend Arbuthnot, we are reminded of a certain Doc Friedman who came ramping across the Atlantic a few years ago with a turtle serum that was guaranteed to be good for whatever ailed you. We wonder if Arbuthnot hasn't hired the same press agent, bolder by ex-

perience and enriched by time, and given him *carte blanche*.

We never have been a disciple of bran mash as a diet, nor do we think that whatever is the matter with us is due to the fact that we have departed from the foods of our fathers. If we remember rightly, our fathers lived largely on salt meat and corn bread and long sweetening and we defy the ordinary citizen of the present age to dine thusly and get away with it. Our fathers were hearty eaters and those who were strong enough to survive the hardships of the times and the deficiencies of the diet, lived to be fifty or sixty years of age, sometimes older.

They perhaps didn't have so much cancer, but they had fever and ague and a lot of other ills that we laugh at in these enlightened times and a good many of which were due to lack of balance in their rations.

But this Arbuthnot person declares that white bread is the cause of this onswEEPing malady, along with the folly of good red meat. But we don't seem to remember that there was any special pause given to the advance of cancer during the war when we had meatless days and ate wheat substitutes and the part of the wheat that was left after we sent the good, white flour abroad to feed the boys in the army. And it had not occurred to us that these same boys who were getting the meat and the white bread were dying of cancer at the rate that Sir Arbuthnot would have us believe.

A good many people will disagree with us and will hold out for a diet of hay and nuts and half of an orange but we are going on in our own mild way, eating an occasional thick, juicy steak, and indulging in white bread.

BAKING TECHNOLOGY

*A Journal of
Applied Science
in Baking*



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of Baking*

Vol. IV

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No. 8

Many Units Make Mighty Power

POWER. Stupendous forces. Controlled for service for mankind. That is Niagara. And that is the potential measure of the baking industry.

All the water which flows over the Falls at Niagara ran down some tiny rivulet in the woods of Canada, off Wisconsin's sloping hills, out of the barren wilds of the vast watershed which feeds our inland seas. The rivulets joined forces and formed rivers, rivers flowed on to fill the lakes, and finally Erie tipped its huge bowl into the gorge across which the rocks beneath the rushing waters rim out the mighty crescent of Niagara. In the same resistless way

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every unit of society and of industry finds its level, and cuts out its path to destiny. The same laws control the onward movement of waters and of bakers. But the baker works with conscious purpose to serve his fellows, while rivulets flow on responsive only to the law of gravity.

Every baker who in September leaves his convention at Buffalo to stand in awe before the wonder of Niagara and

through the rising mist sees on either side the great factories which take their power from the combined forces generated in rivulets a thousand miles away may well pause and ponder whether he

is joining his fellow bakers in creating power and added ability for service or whether his inertia, or fear, or narrow vision blocks his progress to success like the log which checks the tiny stream winding down the valley.

An International Exposition

There will be a great Exposition at Buffalo at the time of the convention of American Bakers Association. It will bring together in the largest single room available in this broad land the latest ideas in every type and form of machine designed to help the baker to easier and more profitable production of better things. It will hold out for every baker, in every land and circumstance, a picture of what his shop must be if in the years ahead he is to keep step with his progressing industry. It will mark, with its amazing exhibits, the development of machines to do the work of men, the most rapid advance of any industry out of craftsmanship into manufacture.

But will its story reach the consciousness of 30,000 bakers, the bakers who in every community, in great cities and at crossroads, turn flour into the breads and cakes and pastries which are the staple diet of every family throughout the land?

We can only hope that it will. The earnest effort of every allied tradesman is enlisted in telling the world of bakers that this convention at Buffalo must be their convention and that this exposition must picture the importance and necessity of the machinized shop to every baker. The trade papers which with their weekly and monthly issues provide inspiration, and furnish knowledge to men who have no other way of keeping step in the forward march, are carrying the story to thousands of men who have never been able to go far beyond their shop. And the great organizations of millers who supply the flour, of yeast manufacturers whose

daily service is as unfailing as the sun itself, of every maker of materials which in any way enter into the operation of the shop and the production of baked goods, are all stressing the importance of going to Buffalo in September. We know the organized baking industry will be there for the men who with vision and unselfishness have built bakers associations in every state and united with common purpose to create a great national organization, count the benefits of their annual convention as carefully as they do the increase in the number of loaves which come from their ovens. And we know that from cities and towns scattered across our wide country bakers will come by auto, by special train, singly and in groups, with their families bent on making their convention week their holiday week and their journey to Buffalo at the same time a pilgrimage to Niagara Falls, and with brides who will spend never to be forgotten honeymoons at the end of the trail.

What Will the Harvest Be?

Will the coming together for convention and conference of the progressive, forward looking bakers who prize their association membership, mean anything for the great group of bakers who stay at home, for the thousands who feel that the cost of membership in their national organization is an expense which can be avoided, for the dissatisfied and worried throng who are looking at their industry with clouded eyes and who have no hope for the future and take little satisfaction in the past? It all depends on whether or not the group of men who organized the national association and who maintain its work today, who subscribed to the funds which made American Institute of Baking possible, who send their sons to the School of Baking for education, who look forward to still

greater success for themselves and larger appreciation for their industry, are willing to take back home to their laggard brothers the fruits of their investment in their convention.

It all depends on whether or not this progressive group believes that it can move forward only as the entire industry moves forward and so is willing to continue to carry every burden of education, of research, of genuine service. Of course bakers who are at the same time real business men and community leaders will remember that every successful man owes something to the industry which brought him success and so they will support their association as earnestly as they do their church, their lodge, their Rotary.

So no matter where the thousands of non-supporters stand they will continue to line up with their influence, and money, and constructive thought. And they will go to Buffalo because they know they cannot afford to stay away, because they value the friendships they will renew and the new contacts they may make, because they expect to get inspiration from Hoover and Anderson and Jardine, new visions of women's appreciation of their service from Mrs. Walter McNab Miller, and solid comfort from the appraisal of bread values which Dr. Fishbein will bring to them. They will go to Buffalo too because they will find the meetings of the departments of the program crowded with special and helpful information, and because the dividing of the convention into groups will give them an opportunity to find just the discussions they are interested in without having to sit through long addresses on matters which do not concern their branch of the industry. But most of all they will go to Buffalo because they want to do their part in elevating the baker of bread to the position he should rightfully hold among the servants

of men, and they know that only organized, directed, constructive effort will take the baker from out "the butcher, the baker, the candlestick maker" class.

One Oven Shop Bakers

Hundreds of one oven shop bakers will be at Buffalo. They will go because as members of American Bakers Association they wish to take a part in their program, because as ambitious bakers they want to learn from men to whom success has already come, because they know they can become two oven shop bakers only as they render the service to their customers which is demanded of them. And they will get at Buffalo more by far than any "big" baker can get for they will find inspiration, and friendly help and valuable advice waiting for them in every conference of the convention and every booth of the exposition.

What an opportunity this gathering at Buffalo holds for the one over baker to come out of his shop and keep step with his fellows. What progress will his industry make if a Niagara of new convention-eers flows into the great Armory and asserts its right to a place in the movement to elevate and dignify and honor the baker of bread.

There are no dominant groups in American Bakers Association. The policies of the association are determined by its full membership and the baker with one oven casts a vote equal in power to that of the largest plant in the organization. There are no problems under investigation at the Institute which are not of far more importance to the small baker than to the larger operator. The courses in the school are equally applicable to the small bakery as to the great system plants.

The Institute which will be so active in all convention meetings is the servant of every baker and its most direct and helpful work is done for the baker who has no

laboratory of his own, who has no experts on his payroll, who is just a progressive baker, trying as best he can to make finer goods and build a larger and more successful business.

And for thousands of one oven bakers who cannot come to Chicago to study the work of the association in its home, who have no sons to send to the school to educate, who live in small cities and towns beyond the reach of bakers clubs and who have still to learn the value of membership in state associations, the convention will have a lesson in every session, an inspiration in every address, a profitable suggestion in every conference and a wealth of good fellowship and of comradeship which will pay rich dividends throughout the year.

Some Problems to Solve

Every baker, small and large, faces some new problem with each succeeding year. Today he is wondering whether the amazing development of great chains of bakeries will bring a new form of competition to his town; how he can best meet and solve the distribution problem which grows more acute with the opening of every new chain grocery; whether he should advertise special breads for curious minded folk or put all his selling force behind his leading product; where he can make up the loss of business his house-to-house competitor has taken from him or whether or not he should open branch shops throughout the residential districts. There are a hundred important basic questions which he cannot answer himself and which he still hesitates to ask of his friendly competitor. Where can he ask and secure the answer which means so much to him? And when he has the solution will it be the correct one?

The convention at Buffalo will bring together men who have clearer ideas on all of these subjects than have ever be-

fore gathered for conference. They will bring to the solution of every pertinent question the wisdom gained by long experience, thorough training, successful application of their ideas. And in the discussions no question will be too trivial to command consideration nor too complex to secure the deep study of recognized experts. What baker who has any desire to progress or who has any vision of finer things for himself, his family and his business can say, "On, on to Buffalo may be all right for the big fellow but it doesn't mean anything to me."

Some Details to Work Out

Buffalo is a convenient city to reach. It is on the main line of the great railroads running east and west and it is easily reached from the south. The highways leading to it are paved for hundreds of miles and no trip by auto is more easily made or more filled with pleasure.

The secretaries of state and group state associations are arranging to run special cars and trains for their members. All special trains will reach Buffalo early Monday morning in order that hotel reservations may be taken up, registrations completed and guests comfortably settled for the real work of the week when the convention opens Tuesday morning. There are many hotels in Buffalo, all reasonably priced and all convenient to the Statler Hotel which is headquarters for the Association and where many of the evening functions will be held. Elaborate plans have been made by the local committee which will insure a full program of entertainment for women visitors. And in addition to these features a special program at which excellent speakers will tell their ideas of women in the baking industry will give a new and worth while aspect to the role of women as conventioners.

While the convention closes Thursday

plans should be made to stay at Buffalo the entire week. No visits to Niagara Falls should be arranged until Friday when the entire convention party will spend the day at Niagara. And Saturday should be reserved for a final visit to the exposition which will be too large to study in close detail during the days of the convention.

Guests, Friends and Visitors

Conventions of bakers have something to offer to many groups whose interests lie far outside the bakeshop door. And so at Buffalo we shall see at our meetings and in the exposition booths the men who administer the pure food laws, the health laws, the sanitary laws and ordinances.

Editors will be there to learn something of the plans and policies of the industry, writers will attend because they know that nothing is of more interest or importance than the story of bread, educators will come to Buffalo that they may find new ideas in technical training, engineers will come to study the machinery exhibits, architects to learn the newest ideas of the bakery operators.

The Power of Many Units

The men who come to Buffalo will determine for years ahead the path the baking industry will follow. Out of their planning will come a more perfect organization of the industry or perhaps a conviction that the baker is not yet ready to take the place which is being made for him among the service industries. But to those who as members of American Bakers Association and as its honored guests, draft the plans for developing better bakers clubs, for meeting criticisms, for securing favorable legislation, for increasing the consumption of bakery products, this convention will bring an opportunity of constructive service as never before come to any baker.

And so with the joined forces flowing

in from every state and every interest, there will gather at Buffalo the united power of our great industry, a veritable Niagara in its potential strength, and like the Falls which form the perfect background for our convention week, a force for usefulness which needs only to be directed and controlled to render still greater service to the world.

The Vote is Unanimous

TOM MASSON is our humorist. And now we hail him as epicurian, philosopher and patriot. In a letter to the New York Times he bemoans the passing of pie from restaurant menus and takes the stand beside Patrick Henry in demanding his rights:

"Today I went into Maillard's Restaurant and asked for pie. They did not have it. There are doubtless others. I think an investigation should be held to ascertain how many of the better-class restaurants in New York do not serve pie. I came from the pie belt of New England. Emerson ate pie for breakfast. If, one by one, our restaurants drop pie, which, if I may judge from the signs of the times, is the last stronghold of the Yankee, what is to become of us? Even now we are facing a pieless future. How about Sherry's and the Ritz? The waiter stared at me so hard at Maillard's I had no heart to go further.

Pie is an American institution. The effete pastry of Europe is all very well, but as for me, give me apple pie or give me death!"

—Thomas L. Masson.

To Doubting Thomases

"If you tell me that the public eats all the bread it can use, and that it can be made to eat no more, I should like you to tell me how Lord Leverhulme made the people use so much soap."

From "The National Association

Review, London."

BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

H. E. BARNARD, Editor

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AUGUST 15, 1925

We Work Together

To win through knowing our markets and developing their full potential possibilities, a higher place for the baking industry in the great family of America's business life.

Carrying It Home

IT is an ill wind that will blow from Buffalo to every bakery whose proprietor does not keep his mind during the convention and exposition on points that he can apply upon his return home.

No bakery that is progressive and is making money is the same today as it was five years ago. The conditions which then unlocked the doors of success to the baker no longer provide the key to it.

The gathering at Buffalo is your chance to give the fine white clean reputation of your bakery a new coat of paint, which I think should be called mental white paint. What a wonderful opportunity to check yourselves and see how far you personally have slipped in your method of operation, check your machines with the latest models on display. In the general convention

meetings, check up with the leaders of national thought and find out how your industry registers at Washington, what the consumer thinks of your industry and the slant of the State and public officials. In the special meetings you can throw your ideas into the common pot and draw out the ideas of all others actively thinking on kindred special problems. With the Engineers you can match up production problems and production ideas. With the Trade Promotion men you can find out the newest selling ideas that are gaining acceptance. And, while listening on them, think how much these ideas have changed in the last five years period. If you bake cake, you will find the cake men in conference to match their ideas with yours. If you are a pie baker, they will be on the job and will hold a special session wherein you can express your ideas and get theirs. And during all this time, the big thing to do for you is to see how the general problem fits into your own bakery at home and fits into the problem of handling your own customers.

The spread is going to be laid before you at Buffalo. What you get out of it depends upon your digestion and your ability to turn it into the blood and sinews of your business. Come to Buffalo. Yes, but take home from Buffalo all there is there for you to take.

LOUIS F. BOLSER,

President, American Bakers Association.

Delegates to Conventions

BAKERS' clubs and local associations who have not already done so will be appointing their delegates to the Buffalo Convention this month. In an industry so large as ours only one baker in ten finds himself able to arrange his work, delegate authority, or represent his company at the National meeting. While un-

fortunate in his inability to hear and see for himself all the good things which are gathered together for his benefit, the man who must of necessity stay at home has the opportunity of hearing all about it from the delegate who returns to report.

Interest in conventions has been stimulated in a new way recently by the Advertising Club of Fresno. Printer's Ink of July 9th tells it in this way: "In order that a large delegation may be encouraged to attend the twelfth district convention of the Associated Advertising Clubs of the World at Seattle, Wash., the officers and directors of the Fresno California Advertising Club, have made an offer of \$50.00 to each of the first ten members to qualify as delegates. The delegates are required to enter a three-minute speaker contest."

Here is a novel way of training delegates to stand on their feet and represent clearly and forcibly the opinions or policies held by the local men who had to stay at home. How badly do the local bakers' groups need men who can state their case before an audience.

How much more interesting the meetings will be when such a trained speaker returns from the convention to tell about it to the "stay-at-home" folks.

The district or local association which does not send its delegate to Buffalo is remiss in its duty to its members and has lost its share of the convention.

Pie Bakers at Buffalo

PIE bakers are watching the changing methods of distribution as competition in foods becomes more and more complex. Some "view with alarm" as is their habit, while others see in the sandwich shop, the box luncheon, or the portable automat vending machine a new opportunity to prove that pie is the National Dessert.

The quality pie has joined the family of aristocrats among the retailer's sweet goods and the "special" milk breads. When the Chicago market found a quicker sale for a richer pie at a better price the Tea Room trade was won. As in the case of bread, the patrons of the new food shops took a new interest in pies. These patrons went home with another baker's pie hoping to please the family with the same satisfying tastes they themselves had rediscovered.

At Buffalo the Pie Bakers will be discussing with each other the meaning of these new methods of distribution, and listening to an expert on pie advertising. Some will find out why it is they dare not advertise because of inadequate accounting. Others will find themselves at the parting of the ways between the old and the new in production practice. All will hear about the progress of American Institute of Baking in establishing a foundation of scientific facts for pies as among the best of foods, and build on that a program to teach the importance and health value of pies to a nation.

Bread

A gay fluttering wind,
Suggesting violets in the woodlot,
Little boys shooting marbles,
Girls at their jack stones,
The heavy drowse of noonday;
From the cottage window
The fragrance of the new-baked loaf,
Peace, contentment, plenty.

Soft rain beating on the roof tin,
Little boys sailing boats and splashing
their clothing,
Girls cutting paper dolls on the hearth
rug,
From the wood range
The warm smell of fresh bread,
Peace, contentment, plenty.

—Helena Alice Roose.

A Challenge to Your Interest

THAT black bound copy of Proceedings mailed to every member of the American Society of Bakery Engineers last month is a proud challenge to the whole Baking World. It contains more answers to practical questions about shop production than have ever been brought together between two covers of any book. But it is only a part of the vast stores of knowledge which are carried to every big meeting in the minds of five hundred modern, trained, experienced production men. Tap it at will, and experience will bring forth the answer. Or if experience is lacking, the problem is then and there assigned to him best fitted to discover the answer, and a report is delayed but a few months.

How different from the old, pitifully selfish, and utterly foolish idea of craft secrecy which mistook ignorance for strength. A great lesson has been learned by the industry. Never again will any individual baker with his hoarded knowledge be so good a man as he who can best answer the need of his brother baker for a better way.

Here then is epitomized the new industry, "one for all, and all for one." Every gathering of men projects its spirit into an atmosphere of psychic influence that can be felt by everyone within its boundaries. The Crystal Room of the Hotel Sherman through those four days of conference last March held none of the suspicion, the questioning glances, the distrust of motives which have made so many bakers' gatherings a cold and comfortless group. There was welcome there, and friendship, and a glad appreciation for those officers and members who gave so freely of their time and knowledge that other bakers could return to the outposts of their industry and better serve

their community. The welcome was there as plainly as though one heard it. "Come in, Brother, if I can't help you someone else here can."

That same spirit of unselfishness had likewise characterised the meeting of the first Trade Promotion group the previous month. A hundred men, from coast to coast had come to Chicago to exchange their ideas about sales, the training of salesmen, the value of advertising, market analysis, and the cost of distribution. So satisfactory was the experience that they went on record, planned for another conference, and took home with them new ideas, new enthusiasm, and a determination to work with their associates that all might prosper. During the year the importance of better merchandising methods has become so real that Trade Promotion headquarters has been flooded with questions and requests for information. New data was sent in gladly, for the benefit of all, where before these executives were afraid to tell much about their business methods.

Out of these experiences came a knowledge that organization at home was the quickest way to eliminate misunderstanding and promote confidence. Within the last year half a hundred new Bakers Clubs have been built up within the State and National Associations. Bitter competition is being transformed into friendly rivalry, no less keen, but always more profitable and more considerate. The dominating influence in that community is transferred from the one who was bitterest enemy to him who can be truest friend. Surely a great industry is safe in hands such as these.

And now comes another invitation to every baker in the land to take his part in these conferences. The fact that his

business may have prevented his attendance last winter makes this invitation doubly urgent. Four full afternoon sessions at Buffalo will be given over to special conference meetings. While the main programs in the mornings are for the whole industry, the afternoon meetings are divided into sections, so that every baker there can listen to and talk about the particular problems which are of most importance to him, whether retailer or wholesaler.

Wednesday Afternoon

On Wednesday afternoon the Trade Promotion Conference starts its work for better methods and more profitable merchandising.

The baker who runs his shop without accurate records of costs is reaching for the red ink. Tom King, recognized expert in Bakery Accounting will act as leader for discussions on cost accounting practice. With him will be the other accounting men, all well known to the bakers, ready to help with public discussion or private council.

Market analysis furnishes the only authentic information on which the baker can build his successful sales plan. The best general methods for conducting market surveys will be worked out under the leadership of Henry Stude.

Bakery Advertising has changed so much in the last two years that bakers are clamoring for more information about the value of bakers' products to put into copy. Some are pooling their efforts in the community to better impress the housewife with the importance of bakers' bread and reverse the attacks on white bread. Alex Osborne, himself a bakery advertiser, and one who has a national reputation for putting food products on the sales map is to be our leader on that subject.

Thursday Afternoon

Harry Newman Tolles is internationally known as the greatest teacher of Sales Executives in this country. President of the Sheldon School of Salesmanship, he is devoting the entire week at Buffalo to helping the baker with his job of building a better sales force. American Laundry Owners Association have put the job of training their entire industry's sales force into his hands, in recognition of the increased business which came from his work with them last year. His talk and discussion Thursday afternoon at 2:00 o'clock will be a high point for every salesman and executive in Buffalo.

How the local baker can best co-operate with his public health workers, with the physicians, nurses, schools and club women to teach the real health value of bakers' products will be told by Miss Carroll Keller, Director of Lay Education for the Illinois Medical Association, now in charge of the state program for nutritional education.

More than a hundred local and district bakers' clubs, "Dough Clubs" or associations, organized throughout the country, are working for the best interests of their industry. The coming year's activities, arrangement of programs, and planning for effective increases in business will be the problem of members and secretaries. After their own conference, the Association Secretaries will discuss the coming year's work with their baker members, under the leadership of Charles Ehlers, Secretary of Indiana State Bakers Association.

These conferences alone are an opportunity for information and new ideas which progressive bakers will travel far to get. Even borrowed money could find no better investment for insuring increased business.

A Flier in Quality

MARSHALL O. DENSBY, Vice-President of Illinois State Bakers Association, has long been active in Association work. His wide experience and acquaintance with bakers of sweet goods has convinced him of the sales power of superior quality. He told the story of his recent experiments in quality to a few bakers to prove it.

The "Wednesday Special" the first week was Danish Pastry, the second week a large coffee cake. But instead of a special price it was special quality that was advertised. The richest possible formula was used. Would the public pay the added price demanded by expert craftsmanship and the most expensive ingredients? They did. Not a piece was left.

Would these customers recognize the quality, would they appreciate the effort, would they come back for more? They did. The third week it was a special pound loaf of bread, rich in health value, in color, in flavor. The loaf sold at a premium!

The baker who can only get new business with cut prices may learn a lesson from Densby's Flier in Quality. A cut price is advertising for a reduced quality. The public is growing quality-wise and can't be fooled much longer.

Health by the Pound

THE telephone was 50 years old last month. Thousands of loaves of bread were ordered over the 'phone this morning because the housewives know that they will receive the biggest, most nutritious package they can buy for the money.

"Phone for Food" has become an amazingly successful campaign in the grocery stores within the last six months. Are these housewives ordering your bread *by name*, or just bread? Does she *know* yours is the quality loaf, rich in milk, therefore, rich in health?

Miss Keller, directing nutritional education for Illinois, is to tell us at Buffalo how the baker can sell his bread as "health by the pound" instead of as "a loaf of bread."

Shoofly Pie

APPETITE appeal comes through old-time odors, fragrant flavors, attractive pictures. The subtlety as well as the directness of the appeal to our sense of smell or taste or sight is a measure of good advertising psychology. The following story of the pies from Southern ovens should be retold by all pie bakers, for the reading of it makes the urge for pie irresistible.

"The iron door of the oven, waist high above the sidewalk or the hearth, is half open. Cherry pies, apple pies, shoofly pies, are slowly browning under that comfortable dome. Nobody, not even a pie, wants to go into a contracted oven. These pies lounge around in gossipy groups. Yonder, way back, is a milkpan pie with latticed crusts. Its depths conceal pork tenderloin, fresh herbs, cream, and a dash of cornmeal. The shoofly pies show their raisins, cooking up through egg and molasses and butter. They are one of the great contributions of the South to the world's cuisine. The molasses of ribbon cane—which is a peculiarly delicious sugar cane that will not granulate and has therefore a very limited sphere of commercial value—is boiled down, united with butter, cooled, beaten with egg yolks and combined with raisins rolled in flour. And the top of the pie is sprinkled with salt. From Louisiana to Georgia and throughout coastal South Carolina this absolutely incomparable custard is to be met with wherever the family cookbook and the family prayer book have stood inseparably together."

—Wm. Reader Hersey,
Saturday Evening Post, 6-20-25.

Up From The Soil

The Story of Wheat from the Field to the Table as Told in a Volume from The Manhattan Library of the Bank of the Manhattan Company

Some day Sinclair Lewis will, out of his Sauk Center, Minnesota background, write the dramatic story of the wheat farmers who opened and built our Northwest Territory. "Give Us This Day Our Daily Bread" is the universal human appeal, still the urge to progress in every land." The fascinating tale of the development of wheat farming and its relation to the growth of American ideals follows in this second installment of *Up From The Soil*.

Chapter Three

FARMING WITH STEEL

THE farmer of old made his own crude tools, depended on his hands and animals for all labor, and had to carry any surplus crop to uncertain markets. In his isolation he naturally was distrustful of methods. As late as 1800, when the first cast-iron plow was offered, some feared that it would poison the land. The reaping machine was practical for ten years before one could be sold; in the twelfth year only two were sold.

The whole history of invention has been much the same in this respect. All mankind has crept upward slowly, doubting, shrinking, hesitating at the shadow of every mile-post of progress.

Reluctance to grasp the significance of time-saving still lingers. In many countries, men, women and children with ancient reap-hooks in hand are still to be seen laboriously cutting the standing grain, followed by other men, women and children gathering the stalks in their arms, binding them into sheaves and, later, threshing out the grain with flails or the trampling hoofs of cattle. It seems strange that these antiquated methods could exist in the same world and at the same time with the motor-driven harvester-thresher that reaps forty acres in

a day and pours the threshed grain into the wagon moving at its side.

Almost simultaneously with the first practical reaper came the railroad and soon these two had become co-working parts in a developing industrial system. Together they gave an impetus to agriculture which sent a thrill of new life into every branch of business.

The subsequent increase in the invention and use of time-saving farm machinery has been remarkable. The first reaper called for faster plowing, better harrowing and the use of the grain seeder and the threshing machine. These in turn brought on the self-binding reaper; and this again called for still higher speed all along the line. The gang-plow, the disc-harrow, the force-feed drill and the power thresher were racing now.

The horse could not keep up the pace or power demanded, and the farm tractor entered. This "steel horse power" enabled one man to combine and direct as one the power of sixty horses. With this new aid he could draw not only as many as sixteen plows, but a full train of disc-harrows and drills besides, thus performing at one operation the whole process of preparation and planting, at the rate of forty-five acres a day. The farm tractor was also made available in smaller units to fit the needs of the farmer who cul-

tivated a small plot and needed to draw but two plows at a time.

Increase of power is not the only contribution of the tractor. In plowing, seeding and harvesting, timeliness is a vital factor of successful production. If the late summer sun be too hot for the horse in the arduous work of plowing that should then be done, the steel horse does not feel the burning heat. The harvest must be gathered before the rains come. The tractor enables the farmer to do it at exactly the right time.

But, in spite of such new resources, agriculture has not yet attained rank among those industries which are highly mechanized. Machines for every purpose and power for every demand have been made available; nevertheless, curiously enough, the examples of wealth production through time-saving machinery, as demonstrated in the mills and factories of the land, are only beginning to be understood and followed by the oldest industry in the world.

Only a small part of the total agricultural output, even in America, is as yet produced by aid of power machinery. But this small part furnishes significant indication of what it can do for agriculture. Consider, for example, that the census showed 1,700,000 fewer workers on the farms in 1920 than in 1910, and yet in the same period there was increase in the quantity of each one of the important cereal crops. This increase ran as high as thirty per cent. in the case of wheat.

Only one century ago, the production of an acre of wheat required sixty hours of man's toil; today, it has been reduced to as low as three, although the average probably is nearer ten. To state this in another way may help us in grasping this important point. It concerns the wheat crop of 1924 which was large enough to supply our own needs and to make up

the shortage in many other countries. This crop was produced by American farmers with their limited use of mechanical aids and yet, if it had depended solely on the methods of three generations ago, the entire 114,000,000 people of our population and 59,000,000 besides would have had to engage in the occupation of wheat farming!

This means more than the promise to consumers of steadily increasing agricultural production at decreasing costs, for it also lightens the labor and increases the rewards of the farmers themselves. It likewise releases from the farms great armies of workers to engage in the other industries that are swelling the volume of general prosperity and multiplying the comforts and conveniences of life for all. Furthermore, it has lifted from the back of the farmer's wife much of her burden of constant drudgery. It has permitted her to take her rightful place as housewife and citizen and has given her children the opportunity for adequate schooling.

With abundant power to draw upon, with the use of highly improved tools of every kind, with scientific knowledge at his command, the old farmer of unceasing physical toil is becoming transformed into a new type, who is business-man, scientist, machinist and leading factor in the co-operating forces of production and trade. As the Twentieth Century passes into its second quarter, farming is seen to be preparing to take its place among the world's efficient industries.

Chapter Four

IDEALS AND WHEAT

FOR many years, America has held the leading place among the world's producers of wheat. The story of American wheat raising is interwoven with that of our commonwealth itself, and must be

considered by anyone who would understand the great nation-building forces that have given this land its present character.

It began with the coming of the earliest settlers. No sooner had they cleared small patches of soil than they planted therein the seed-wheat brought with them on the long ocean voyage. They were in revolt against unjust restrictions, and sought greater freedom of opportunity. Thus they brought ideals as well as grain with which to seed the virgin soil of a new world—ideals of individual initiative, voluntary, not enforced, co-operation, and the incentive for labor that is found in private ownership of the fruits of toil. Such ideals imparted optimism and energy to the new civilization that now began to force its way irresistibly across a savage continent, planting wheat as it went.

Up to a century and a half ago American wheat-growing centered near the Atlantic Coast, then the cheaper, lustier valleys of the Genesee in New York and the Juniata in Pennsylvania called to the wheat-growers and migration followed. This was the beginning of a series of great movements westward. The triumphs of the Genesee and the Juniata were brief, for Ohio beckoned, then Illinois.

Ahead was ever the lure of new and cheap soil and the thrill of adventure which called to the restless pioneer spirit. Again and again the wheat-growers pushed onward.

The great movement westward, to which gold as well as golden grain had joined its lure, became a tide, sweeping forward in waves, each of which bore on its crest a period of great prosperity.

The reaping machine came to facilitate production, railroads began to stretch their lines into the new regions and were joyously acclaimed by the set-

tlers who found in them a means of access to wider markets. Industries sprang up in the older settled regions, creating more and more demand for wheat.

Steadily the tide advanced, spreading as it went, until it stretched from Montana to Texas, and much of the vast wilderness once known as "the great American desert" was flooded with grain. Then, in our own time, it found its western limit and overflowed northward into Canada. No longer was there any "farther west."

The pioneer impulse, that began on the rocky soil of New England and was carried on by later arrivals from the North of Europe, left behind it an empire beyond the utmost dreams of the early settlers, an empire achieved by severe toil of brawn and brain.

We have today some 114,000,000 people, about one-third of whom consist of farmers and their families. Our 500,000,000 acres of improved farm lands are valued at seventy-eight billion dollars. Our agricultural product amounts to almost fifteen billion dollars a year.

These material resources are greater than those of any other nation. But the real explanation of our progress is not material; the richer resource lies in the initiative and self-reliance of our people, first established in that process of self-selection which drew hardy, liberty-loving adventurers away from the greater comforts of an older civilization. To these we owe the discovery and development of our material resources and to these we owe the creation of a nation and a social system based on ideals of equal rights, equal opportunities and equal responsibilities.

The value of this system becomes clearer if we contrast American conditions with those, for instance, prevailing in sorely tried Russia. Before the War, that great land was second only to the

United States in wheat production and had an average export of 162,000,000 bushels, half again as much as the exports from the United States. Afterwards this excess supply gave way to deficit and Russia was forced to call for millions of bushels from outside sources. What had happened? The broad plains still had their native fertility; the skies were still friendly and the rains still bountiful; millions of farmers trained to the growing of grain still were to be found throughout the land, yet Russia imported wheat where once she exported it.

Why? Because of the absence of exactly those rights and privileges which we of America have come to regard as a matter of course. The peasant farmers, having learned that any surplus over their own needs was liable to be seized by the government, and being forced to common use of land without private ownership, no longer produced that surplus, and the nation was impoverished when it might have become rich. The hand is wanting in energy when the heart lacks opportunity and purpose. Social co-operation must be voluntary in order to be effective; it crumbles under compulsion.

(To be continued)

Half True Half False

AN advertisement which recently appeared in a women's magazine with a boasted circulation of a million and a quarter is so strange a mixture of fact and fiction that it may well be studied as an illustration of misleading food advertising. The copy runs: "One in every three of us—rich and poor alike—suffers from malnutrition, authorities say, not in Russia, in Austria, in Armenia, but here in America, the world's greatest food producing nation.

"You hear every day complaints of that tired feeling. You see your friends developing 'nerves,' weakening under the strain of our modern life. Why? Those who study these things say the underlying cause in most cases is malnutrition—lack of the right kind of food. Though you eat enough food, the chances are one in three that you or your family do not get enough of certain food elements. The body is composed of sixteen vital chemical and mineral elements."—Ad nauseum,—and closing its mineralogical dissertation with the startling statement that "only in the whole grain of the wheat can all of the sixteen vital elements of nutrition be secured."

As a matter of fact it is probable that a teaspoonful of garden soil would furnish the mineral elements in even larger quantities. But do we need a teaspoonful of dirt or a diet of whole wheat though it be mineralized with sixteen vital elements? The baker has no quarrel with whole wheat bread. He likes it. He bakes it. He would bake more of it if anyone would buy it. Indeed he is willing to spend real money advertising the estimable virtues of whole wheat bread as a wholesome food and an admirable peristaltic stimulant for those who need it as a medicine. But he resents any advertisement which deliberately caters to the hypochondriac, which throws doubt on the suitability of bread as a food, which capitalizes the plaint of those chronic constipants who would scare our well fed white bread eaters into deserting a diet which meets their every nutritional requirement.

The more we see of criticisms of bakers' bread, the more convinced we are that it is a real duty of the Institute to meet these attacks and to set bakers' bread so high in the list of wholesome and desirable foods that its maligners will forever hold their peace.

Influence of Storage Conditions

On the Diastatic Power and Color of Malt Extracts

By WILLIAM C. LUCKOW*

The following investigation was undertaken by the writer in co-operation with A. W. Landstrom* for the purpose of studying the keeping qualities of diastatic malt extracts under various conditions of storage. The period of observation extended over a little more than one year and has now been concluded.

Purpose of Investigation

The original purpose of the investigation was to study the effect of the storage of malt extracts under various conditions upon the diastatic power, but during the progress of the investigation pronounced changes in the color of the stored samples were observed and it seemed desirable to include systematic observations of color in our study.

Material Investigated

A typical malt extract with a diastatic power of 29° L. and a color of 67.5 was chosen for our experiment. The analysis of this material, which was a commercial product, is shown in Table I.

TABLE I
ANALYSIS OF MALT EXTRACT USED
IN TEST

Specific Gravity	1.396
Baume	41.2°
Water	22.75
Extract	77.25
Reducing Sugar as Maltose.....	70.76
Protein (NX6.25)	5.33
Ash	1.38
Phosphate (P ₂ O ₅)	0.63
Color	67.5
Diastatic Power	29° L.

*Formerly Chief Chemist of Analytical Laboratory.

Conditions Studied

The effect of different temperatures of storage upon the diastatic power and color was one of the most important conditions studied. In order to secure different temperatures of storage the samples were kept in various parts of our bakey. In this way, while definite constant temperatures were not maintained, yet the samples were kept under conditions that would approximate those found in the various places in an ordinary bakeshop.

Another condition studied was the effect of time of storage upon the diastatic power and color of the sample. In order to determine the effect of this factor the investigation was extended over a period of a little more than one year.

As it was suspected that light might have some influence upon the diastatic power and color of malt extract, the effect of storing the sample in white and brown bottles was also studied.

Procedure

The malt extract with an analysis as shown in Table I was filled into four one-pound, wide mouth, transparent glass bottles and four one-pound, wide mouth, brown glass bottles. Each bottle was closed with a cork through which passed a thermometer with its bulb immersed in the syrup. The bottles containing the syrup were then placed in various parts of the bakery as follows:

(1) One transparent bottle and one brown bottle, marked 1L and 1D respectively, were placed in the basement flour storage room.

(2) One transparent bottle and one brown bottle marked 2L and 2D re-

spectively, were placed in our insulated materials storage room on the second floor.

(3) One transparent bottle and one brown bottle marked 3 L and 3 D respectively, were placed in the oven room near the ovens.

(4) One transparent bottle and one brown bottle marked 4 L and 4 D respectively, were placed in the ice box in the general laboratory.

The test was continued from October 26, 1922 to November 11, 1923, a period of a little more than a year. During this period the temperatures of the various syrups were taken morning and evening, every day in some cases, and in some cases every other day. After the temperature readings had been taken, the stoppers were removed momentarily to imitate the procedure of the baker when removing his syrup for use. The diastatic power was determined at frequent intervals during the experiment. The color was determined at the same time that the diastatic power was determined, but as stated before, the color determinations were not started until after the experiment had been in progress for some time.

Observations

In order to simplify the presentation of the data I have not given the entire list of the temperatures taken but have given instead the average temperatures over approximately ten-day periods as shown in Table II.

The diastatic powers and colors of the various samples were determined by our usual methods of procedure and the results are shown in Table III.

A few slight irregularities may be found in Table III. The slight fluctuations in the diastatic power are within the accuracy of the method and should not be given undue consideration.

From the various tables it will be observed that:

1. Samples 4-D and 4-L, which were kept in the ice box at an average temperature of 12.2° C. remained practically constant in diastatic power but suffered a slight darkening in color.

2. Samples 1-D and 1-L, which were kept in the basement flour storage room, at an average temperature of about 19.5° C., or 7.3° C. higher than samples 4-D and 4-L, remained practically constant in diastatic power throughout the experiment but showed a considerable darkening in color. It will be observed that this darkening in color is especially noticeable during the period in which the temperature was above the average. For the first five months, during which time the temperature was usually below the average for the period, very little darkening in color occurred. A very decided darkening in color took place in the last few months of the experiment, during which time the temperature fell steadily from its maximum to about the average temperature.

3. Samples 2-D and 2-L, which were kept in the Materials Storage Room at an average temperature of 22.4° C., or 2.9° higher than Samples 1-D and 1-L, showed a very slight decrease in diastatic power after about eleven months storage and also showed a considerable darkening in color throughout the experiment, becoming nearly twice as dark as samples 1-D and 1-L. It will be observed that a considerable darkening in color took place during the period in which the temperature increased to the maximum, but it will also be observed that a considerable increase in color also took place after this period even though the temperature fell steadily, in fact, the color increased more rapidly during this period than it did during the preceding period in which the temperature rose.

TABLE II
RESUME OF TEMPERATURES—Degrees Centigrade

Date	1 D	1 L	2 D	2 L	3 D	3 L	4 D	4 L
1922—								
Oct. 26 to Nov. 1.....	22.0	22.1	23.8	23.8	31.3	31.4	15.6	16.0
Nov. 1 to Nov. 10.....	21.9	21.8	22.5	22.5	28.2	28.2	13.5	13.5
Nov. 10 to Nov. 20.....	20.3	20.2	19.6	19.7	25.4	25.4	12.1	12.2
Nov. 20 to Nov. 30.....	18.9	18.9	21.0	21.0	24.5	23.5	11.9	12.2
Dec. 1 to Dec. 10.....	17.9	17.9	20.9	20.9	27.3	27.1	12.8	12.8
Dec. 10 to Dec. 20.....	15.9	15.9	16.8	16.6	28.6	28.3	9.8	10.0
Dec. 20 to Dec. 31.....	16.1	16.1	17.2	17.2	27.1	26.7	10.1	10.0
1923—								
Jan. 1 to Jan. 10.....	14.7	14.7	15.4	15.4	25.2	24.8	10.2	10.2
Jan. 10 to Jan. 20.....	14.6	14.7	15.9	16.0	27.2	26.7	11.5	11.5
Jan. 20 to Jan. 31.....	14.6	14.6	18.8	18.7	22.3	23.4	9.5	9.8
Feb. 1 to Feb. 10.....	14.3	14.3	17.6	17.2	24.2	24.4	9.6	9.7
Feb. 10 to Feb. 20.....	12.9	13.0	16.5	16.1	26.8	27.1	9.5	9.9
Feb. 20 to Feb. 28.....	14.3	14.2	18.1	17.6	26.2	26.3	10.6	10.5
Mar. 1 to Mar. 10.....	16.5	16.6	19.4	19.1	27.9	27.7	10.5	10.1
Mar. 10 to Mar. 20.....	15.1	15.1	17.7	17.4	27.6	27.7	9.9	10.2
Mar. 20 to Mar. 31.....	14.4	15.1	18.5	18.3	28.1	27.6	12.0	11.4
Apr. 1 to Apr. 10.....	17.1	17.2	18.5	18.7	27.3	27.0	11.6	11.7
Apr. 10 to Apr. 20.....	18.0	18.1	19.7	19.3	27.3	26.8	9.6	10.1
Apr. 20 to Apr. 30.....	19.2	18.4	21.3	21.3	22.2	21.9	10.5	11.0
May 1 to May 10.....	19.5	19.8	23.4	23.4	29.0	28.8	11.3	11.2
May 10 to May 20.....	19.4	19.6	21.7	21.7	23.1	23.1	10.9	10.9
May 20 to May 31.....	19.7	20.0	23.6	23.6	27.4	27.7	11.5	11.2
June 1 to June 10.....	21.5	21.5	27.0	27.0	32.8	32.4	15.7	15.9
June 10 to June 20.....	21.4	21.4	25.9	25.9	32.2	31.9	13.7	13.7
June 20 to June 30.....	23.8	23.9	28.8	28.8	33.5	33.0	15.2	15.3
July 1 to July 10.....	23.0	23.1	28.3	28.3	32.2	31.5	12.1	12.0
July 10 to July 20.....	24.9	25.1	30.1	30.1	32.2	32.1	16.5	16.6
July 20 to July 31.....	25.3	25.4	30.0	30.0	31.9	31.8	15.5	15.9
Aug. 1 to Aug. 10.....	25.1	25.1	28.1	28.1	30.6	30.6	15.8	15.9
Aug. 10 to Aug. 20.....	23.3	23.5	27.6	27.6	26.5	26.6	13.4	13.3
Aug. 20 to Aug. 31.....	21.9	22.0	24.3	24.4	23.3	23.4	11.8	11.8
Sept. 1 to Sept. 10.....	24.2	24.3	27.3	27.5	26.9	27.2	15.6	15.4
Sept. 10 to Sept. 20.....	21.4	21.6	25.1	25.1	31.1	31.8	11.5	11.3
Sept. 20 to Sept. 30.....	22.3	22.5	26.5	26.6	32.1	32.6	14.2	13.9
Oct. 1 to Oct. 10.....	22.3	22.5	26.4	26.4	29.8	29.9	12.2	11.7
Oct. 10 to Oct. 20.....	21.9	22.0	25.6	25.5	30.2	29.9	13.9	13.5
Oct. 20 to Oct. 31.....	20.3	20.3	23.1	23.0	26.5	26.2	11.2	10.6
Nov. 1 to Nov. 14.....	19.5	19.5	21.6	21.7	23.5	23.8	11.4	11.3
Average	19.4	19.5	22.4	22.4	27.8	27.8	12.2	12.2
Maximum	25.3	25.4	30.1	30.1	33.5	33.0	16.5	16.6
Minimum	12.9	13.0	15.4	15.4	22.2	21.9	9.5	9.7

4. Samples 3-D and 3-L, which were kept in the oven room at an average temperature of 27.8° C. or 5.4° C. higher than samples 2-D and 2-L, remained practically constant in diastatic power for about six months, after which there was a rapid fall until at the end of the experiment it had reached a value equal to about half of its original value. The greatest change in diastatic power seems to have occurred during the period in which the temperature was above about 30° C. but there was also a considerable decrease during the last few months when the temperature

TABLE III

Results on Diastatic Power (D.P.) and Color. The Diastatic Power is Expressed in Degrees Lintner (°L)

Date	Days from Start of Experiment	1				2				3				4			
		1-D		1-L		2-D		2-L		3-D		3-L		4-D		4-L	
		D.P.	Color	D.P.	Color	D.P.	Color	D.P.	Color	D.P.	Color	D.P.	Color	D.P.	Color	D.P.	Color
1922—																	
Oct. 25..	0	29°L	67.5	29°L	67.5	29°L	67.5	29°L	67.5	29°L	67.5	29°L	67.5	29°L	67.5	29°L	67.5
Nov. 2..	8	28°L		28°L		28°L		30°L		28°L		30°L		28°L		29°L	
Nov. 13..	19	30°L		30°L		29°L		31°L		31°L		29°L		30°L		30°L	
Nov. 23..	29	29°L		29°L		30°L		29°L		28°L		28°L		29°L		29°L	
Dec. 1..	37	31°L		32°L		32°L		31°L		32°L		30°L		31°L		31°L	
Dec. 8..	44	31°L		31°L		29°L		30°L		30°L		29°L		30°L		31°L	
Dec. 15..	51	30°L		29°L		29°L		29°L		30°L		30°L		29°L		30°L	
Dec. 22..	58	30°L		32°L		31°L		31°L		30°L		29°L		31°L		29°L	
Dec. 29..	65	31°L		31°L		30°L		32°L		31°L		30°L		32°L		31°L	
1923—																	
Jan. 1..	72	30°L		30°L		31°L		30°L		30°L		30°L		32°L		30°L	
Jan. 19..	86	28°L		28°L		28°L		28°L		30°L		28°L		32°L		29°L	
Feb. 26..	124	28°L	80	31°L	80	28°L	80	29°L	80	28°L	145	30°L	145	28°L	75	29°L	75
Apr. 2..	159	29°L	80	29°L	78	30°L	88	29°L	88	28°L	180	28°L	178	30°L	66	29°L	66
May 2..	189	30°L	95	31°L	95	30°L	115	32°L	105	29°L	280	29°L	260	30°L	85	31°L	80
June 5..	223	29°L	100	29°L	100	31°L	120	29°L	120	27°L	260	26°L	260	31°L	80	30°L	80
July 9..	257	29°L	100	28°L	100	26°L	135	29°L	135	23°L	400	23°L	400	31°L	75	31°L	75
Aug. 3..	282	31°L	120	29°L	120	28°L	170	30°L	170	20°L	500	23°L	500	31°L	80	30°L	80
Oct. 5..	345	29°L	150	28°L	145	27°L	250	25°L	250	18°L	720	18°L	680	29°L	85	29°L	85
Nov. 16..	387	30°L	170	28°L	160	28°L	300	26°L	300	16°L	800	17°L	800	28°L	90	28°L	90

was usually somewhat lower. The color increased rapidly, the final color at the end of the experiment being about 11.9 times the original color.

5. Practically no difference was observed in the diastatic powers and colors of samples stored in light and dark bottles.

Conclusions

1. The color and diastatic power of the samples were apparently not appreciably affected by the action of light as shown by the practically identical results obtained in light and brown bottles.

2. Since it has been observed that very noticeable changes in diastatic power took place when the temperature reached about 30° C. (86° F.), whereas storing for about eight months at temperatures below this value had very little effect, it seems reasonable to conclude that the ef-

fect of temperature was the predominating factor that caused the change to take place.

3. However, as the diastatic power decreased steadily as the temperature remained practically constant for a period of a few months, as in the period of 6/1 to 7/31 in the instance of samples 3-D and 3-L, it appears that the time factor is also very important if the temperature is high enough. The time factor does not appear to be very important if the temperature is continuously kept below the point at which the diastatic power is affected which in this experiment was about 30° C. (86° F.) However, it appears that the decomposition proceeded with greater ease, with greater speed and at lower temperatures after it had been once started.

4. Temperature had a very marked effect on the color of the sample since

small changes of temperature caused rather large changes in color. Temperatures below about 15° C. (59° F.) had, however, very little effect on the color of the sample even after storage for more than a year. When a temperature of about 20° C. (68° F.) was used, a greater increase in color occurred and when a temperature of 25° C. (77° F.) was used, a very decided increase in color took place and when the temperature exceeded 30° C. (86° F.) the increase was still greater.

5. The time factor plays a very important part in its influence upon color because the color increased considerably during constant temperature periods. It appears to be probable that the time of storage will have practically no effect upon the color of the sample if the temperature is kept sufficiently low. Since even in our low temperature experiment a slight change in color took place, we do not know the temperature which caused the decomposition to start. However, it seems probable that at a temperature a few degrees lower than our ice box temperature, see Table II, practically no change in color would have taken place during the time of the experiment.

6. Time and temperature had a much greater effect upon the color than upon the diastatic power of the sample. In one of our experiments the final color was about 11.9 times its original value while the diastatic power had decreased to about one-half of its original value.

7. Since it seems evident that time and temperature have such a marked influence upon the color and diastatic power of malt extracts, it would seem advisable to recommend that such products be kept in the ice box or in the coolest place available and that they should not be stored too long.

Bakers of quality bread fear neither price cutters nor competition.

Schools for Secretaries

“LET George do it” is but another way of saying “now we’ll make you secretary.” Once the requisite to secretarial preferment was the ability to write a legible hand, but typewriters have removed that limitation. And then came the suave and conciliatory type who could bring two warring price cutters into contact and send them out with but a single thought, and the Federal Trade Commission found that that sort of an association servant was not working in the public interest. Today a trade executive, as many a hard-worked erstwhile secretary is now denoted, is trained for his job as thoroughly as if he were going into any other missionary field. Indeed the modern secretary is a sort of medical missionary, taking the gospel into new fields, building relief stations in the wilderness of unorganized efforts, wiping out epidemics, performing drastic surgical operations, preaching higher ideals of service, teaching the new conception of industry as a servant worthy of his hire.

For five years the Chamber of Commerce of the United States, in co-operation with the American Trade Association of Executives has run a school for secretaries at Northwestern University and each year more men enter the courses and take the intensive training which in practice as in theory better fits them to do their work efficiently and makes them more valuable to the organizations they serve.

The courses cover a wide range of subjects, organization, finance, membership, publicity, conventions and meetings, the secretary and his job, industrial research, safety work and trade association statistics.

Obviously the secretary who assumes the responsibility of organizing and holding together a trade association for the

purpose of building a better industry has gone a long way along the road to recognition as an expert since the days when he served because he had time to spare for the work or wrote a good hand. Today the secretary of any association assumes responsible duties when he takes over the custody of Constitution and By-Laws and goes out to represent his members before the public. The baking industry is rapidly organizing and its groups are being formed because bakers know now that they must think and work and build with a common purpose and a well defined plan.

The men who serve as secretaries are not record keepers or glad handers any longer. They are too mindful of the responsibilities they assume with their secretaryships to look upon their work as a sinecure.

And with the same appreciation of their need for common knowledge the secretaries of bakers associations all over this broad land are coming to the Buffalo convention just as the members of the American Society of Bakery Engineers are gathering, for the purpose of full and long discussion of the problems they face day by day in their work.

They are coming together under the leadership of John H. Woolridge, the secretary of Potomac States Bakers Association, and their conferences promise to be filled with earnest debates on all the topics which the National School for Secretaries is studying in its intensive sessions.

There is one best way to run an association, to hold a convention, to collect delinquent dues, to secure new members and set old members to work. There are well defined methods of handling complaints of competitors, for stressing the value of codes of ethics, for securing favorable publicity and meeting criticisms, for building respect for the industry.

But no amateur secretary, working on the wage of the elevator operator, knows that way or understands the method. The conference at Buffalo offers the first opportunity our baker secretaries have ever had to leave the class of amateurs and acquire knowledge from experts and from each other.

One of the experts will be H. N. Tolles, the president of the great Sheldon School of Salesmanship and a daily speaker of the convention program. Another speaker will be Alex. F. Osborn, for three years a leading participant in the annual convention. And another will be Dr. L. A. Rumsey, the head of the Department of Trade Promotion of the Institute of Baking. John Hartley will be there with his years of experience as a leader of the retail bakers, and Charles Ehlers who has so successfully led the bakers of Indiana, and Wm. F. Ireland and Wallace A. Macpherson from the Pacific coast, beside H. D. Likens of Boston, C. C. Lotus of Pittsburgh, Frank A. Lyons of New York and Fred D. Pfenning of Ohio.

This school for secretaries is a free-for-all, for secretaries of associations who are members of American Bakers Association and for those who are not, for city dough club secretaries and for the leaders of the large group state associations, for men from retailers organizations and for men from the wholesale groups. For this school will teach the one obvious fact, that the baker will succeed only as he serves. And in that fundamental truth all controversies over unfair practices, over unethical conduct, over poor products or poor selling methods will find an honest and final answer. There may be somewhere, some association which feels it cannot afford to send its secretary to school at Buffalo. It is a safe assertion that that association is of little value to its members and none at all to the industry it represents.

A Baker in Washington's Army

*How Christopher Ludwick Served His Country and Organized
Army Baking Practice*

From "The Spirit of the Revolution"

By J. C. FITZPATRICK

Asst. Chief, Manuscript Division, Library of Congress. (Houghton, Mifflin, 1924)

CHRISTOPHER LUDWICK was fifty-seven years old when he accepted the appointment by the Continental Congress of "Superintendent of Bakers and Director of Baking in the Grand Army of the United States." He was an old gingerbread baker in Philadelphia, who, at the call, gave up a well-paying business and a comfortable old age to share the hardships of military life with an army in the field and to make himself responsible for a most important part of that army's subsistence.

He was not unknown in Philadelphia, for he had been in the city, following his trade of baker, since the French and Indian War. He was not unknown to Congress, for he had helped to forward a supply of powder to Ticonderoga in 1775 and, after the Trenton victory, he had taken charge of and fed some of the Hessian prisoners, and wrought so canily with them that they succeeded in inducing the desertion of several of their brethren from within the British lines, who came over to the patriots bringing their arms and accouterments with them.

This appointment by Congress gave Ludwick power to license, with approval of the Commander-in-Chief, or the commanding officers of separate armies or posts, all persons to be employed in baking for the troops; to regulate their pay and take any necessary steps to rectify all the then existing difficulties and failures of the bread supply. He was given seventy-five dollars a month as pay and two rations per day. It is current tra-

dition that when Ludwick's pay was discussed by the committee of Congress it was suggested that he be granted the perquisite of furnishing only eighty pounds of bread for every hundred pounds of flour and that the old man had replied with scorn: "Is it that I should grow rich by such ways? I will bake one hundred and thirty-five pounds of bread for every hundred pounds of flour, and it will be good bread and all the flour will be used, and if there is any flour over, it will also be made into bread."

The army was at Morristown when Ludwick left Philadelphia to take charge of the baking, and he had hardly time to do more than start operations before the campaign opened and the troops broke camp and moved out upon, what was to be, the most active marching campaign of the war. The peculiar uncertainty of movement displayed by the British commander-in-chief at the beginning of the campaign of 1777 was responsible for much of the marching and counter-marching of the Continentals; the troops were almost daily on the move and an enormous supply of bread had to be ready, to meet the continual emergencies caused by unexpected changes in direction of the line of march. To add to these difficulties inexcusable losses of bread occurred from careless handling. Hundreds of pounds of crisp, browned bread would be sent from Ludwick's ovens to the troops in the field, and because no particular officer had been

designated to receive it, it sometimes remained in the open, beside the camp, in the blazing heat of the day and the damp of the night dew. The commissaries of issues declared it was not their affair and the quartermaster officers declined the responsibility of issuing it to the troops, and old Ludwick stormed and swore great oaths at such official stupidity.

When the army turned south from the Highlands, General George Clinton ordered thirty thousand pounds of hard bread, which had been stored at Fort Montgomery, sent on to the marching troops by way of King's Ferry, and found that, for lack of proper storage, most of it was so badly broken it could not be transported and was unfit for use. He attempted to save the unbroken part by collecting casks in which to pack it; but none was to be had, so he sent a hurry call to the Continental storehouse at Fishkill to properly pack and forward thirty thousand pounds from there.

Ludwick's principal troubles were not in the baking of the bread, but in the arrangements necessary before the ovens could be charged and afterwards in getting the bread away to the troops. While he was in control there were but few complaints as to the quality of the bread issued. There was at first some difficulty in obtaining the flour for baking from the commissaries or storekeepers of the different divisions or posts. Congress made no provision for paying the bakers whom it authorized Ludwick to employ, and the old man used his private means to advance the pay of those of his bakers who were civilians; soldiers detailed from the ranks as helpers were on a different footing; but Ludwick kept them in humor by small gratuities. To accomplish this he sold several of his houses in Philadelphia and expended the tidy little fund of ready cash (£3500) that he had made from his gingerbread baking before the war. He

paid these wages regularly every two months, and before he was reimbursed by the military paymasters he suffered further losses through the depreciation of the Continental currency.

The need for bread at the opening of the campaign of 1777 was pressing, and Washington sent Ludwick to Philadelphia to lay the situation before Congress. As a result of his representations, it was ordered that supplies of flour, previously directed to be sold, be baked into "bisket" as fast as possible and that the bakers in Philadelphia be urged to help. The Commissary-General of Purchases was directed to have all the flour in his stores at Lancaster, Downingtown, and Valley Forge, converted into bread. Ludwick could not obtain bakers enough for this activity because most of the journey-men bakers in Philadelphia were serving in the Pennsylvania militia, so Congress recommended to the Supreme Executive Council of that State, that as many bakers in the militia as Ludwick called for be excused from military service for the time he needed them.

The main group of Ludwick's ovens seems to have been built at Morristown, New Jersey, where he had started building them before the army moved from that place. Other small groups were scattered along the route of march in Jersey and at convenient places in Pennsylvania. The establishment of these various baking-posts was decided by the movements of the army and the convenience of the roads. And, though all of them worked steadily with the resources at their command, the bread supply of the army was seldom more than a few days, or a week, ahead of the consumption.

Before the army had fairly settled into quarters that most terrible winter at Valley Forge, the pinch was felt, and a brigadier-general who was directed to

hold his brigade in readiness to march, wrote that he welcomed the orders, as fighting would be preferable to starving. The failure of provisions was most severely felt in the flour supply and another brigadier wrote to the Commander-in-Chief that for three successive days his troops had been without bread, and he doubted if the men could be held much longer. "According to the saying of Solomon," he wrote, "hunger will break through a stone wall," and, indeed, it was a marvel that the Continental Army was held together during the winter of 1777-78.

All the difficulties of the bread supply, as managed by Ludwick, centered around the question of flour. Periods of prolonged drought which withered crops and dried up the water-power in the mills; long-continued and heavy rains which hurt the grain, clogged the roads, and held up the supply wagons; speculators who gambled in foodstuffs, and farmers who held on to their grain for better prices, all contributed to the hardships suffered by the army.

There was always sufficient food in America to feed the Continental troops bountifully; transportation and mismanagement, most of which were avoidable, kept the army nearly always in want. The quantity of the bread ration was cut down many times to eke out the supply during periods of scarcity. Several times during the year 1779, and not always during the winter months, the Northern Department troops were on the verge of mutiny from lack of bread. The ragged finances of the central Government were responsible, in large measure, for the bread scarcity. Purchasing agents strained their personal credit to the breaking-point to obtain flour.

The beginning of the year 1781 brought something of a crisis in bread-baking.

Ludwick had been struggling desperately to maintain the bread supply, but the breakdown of the specific supply system and the confusion in inaugurating the new contract scheme for feeding the army were too much for the old man. He had suffered a crippling accident, and, despite his saving even the sweepings of the flour barrels and gaining a little by selling the empty barrels themselves, he was unable to obtain flour. By his economies and carefulness he had kept the yearly expense of bread-baking below three thousand pounds and "Advanced in years (he was sixty-one in 1781), blind in one eye and almost worn out in the service of his country," was the pitiful way in which he introduced himself to Congress and begged leave to resign.

But Congress declined to accept his resignation. He was authorized to call for money from the military chest of the Commander-in-Chief, and it was voted that

he had acted with great industry and integrity in the character of principal Superintendent of Bakers..... that he be empowered to hire any number of bakers, not exceeding thirty, and that he receive as compensation for all past services one thousand dollars in bills of the new emission.

Ludwick died a year and a half after Washington, and a final touch is given in the answer he gave to a book canvasser who tried to sell him a life of his old Commander-in-Chief, shortly after Washington's death. It illustrates in clear colors the comradeship and human understanding that existed between Washington and those men of the Revolution whom he had tried and found not wanting. Ludwick's answer to the request that he subscribe for a copy of the life was: "No, I will not; I am traveling fast to meet him, and I will soon hear all about it from his own lips."

Foods Which Take Off Weight

Bread May Be Made the Basis of a Reducing Diet by Careful Planning

By ROSCOE H. SHAW

Department of Nutrition, American Institute of Baking

SOME of us will remember that clever story by George Ade—"The Slim Princess." In that far-away fiction country where it was stylish to be fat, two princesses lived; one of these because she was fat was considered very beautiful; the other, slender and willowy, was called the "ugly duckling." The laws of this strange country were such that the beautiful princess could not marry until her plain sister was wed. As the story goes, the slender one plied herself with sweets and in every conceivable way tried to become fat so that she too could be beautiful and have suitors, but all in vain.

The beautiful princess, that is, the fat one, was beginning to feel discouraged knowing that marital bliss was not to be hers so long as the sister remained unattached, when along came an American with our ideas of what constitutes beauty in womanhood, who promptly fell in love with the "ugly duckling" and saved the situation.

George Ade's slim princess is still America's popular girl. The term "stylish stout" no longer holds for the simple reason that it is not stylish to be fat. At no time in history has the subject of food received so much attention as at present. Nutrition is being discussed in the magazines and even the daily press, and no phase of this subject is receiving so much attention as that dealing with reducing diets. There is a deeper reason behind this than simply the improvement of one's appearance. It is not comfortable to carry around a large amount of surplus weight. Moreover certain diseases

are closely associated with overweight, and even insurance companies are teaching their policy holders the principles of sound nutrition; ways to prevent taking on too much weight, and how to reduce when this unfortunate state already exists. But in many cases, especially among young people, the fad for leanness has been carried too far and health has been undermined by starvation diets. Such a condition is as bad as that resulting from overeating. Both are undesirable and often detrimental to efficiency and health.

Middle Life and Weight Increase

As middle life approaches, the tendency to take on weight increases. This is due to the fact that the physical activities slow up while the appetite does not, and may even increase. More food is eaten than is required and the surplus is stored up in the form of fat. The logical way to reduce, of course, is to reverse the process by exercising more and eating less. The body requires food for two principal purposes—one to build and repair tissue, and the other to furnish heat and energy. The growing child requires much more food in proportion to his weight than when adult life has been reached, because food is needed for growth as well as for maintenance, heat and energy. There are two food reserves in the body; the first is glycogen, which has been called "animal starch." This is a sort of temporary reserve and is required more particularly for the heat regulation of the body and for energy emergencies. The second is fat. No doubt this storing up of the reserve of fat was

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originally a wise provision of nature to tide the animal body over periods of food scarcity. It is very doubtful if prehistoric man was troubled with permanent obesity for the excess fat he accumulated during the summers of plentiful food was used up during the winters of food scarcity. This consumption by the body of its own fat is very well illustrated in the case of the hibernating bear. The bear browses around during the summer indulging in an orgy of eating. If he has had good luck, when early winter comes, he is well fattened. Then he enters his long sleep from which he comes out in the early spring having lost nearly half his weight, all ready to revel in the flesh-pots of bountiful summer. During the winter he remained in a torpor; he took in no food, but the body functions, while at low ebb, were still in operation.

Calories

When a pound of coal is burned it gives off a definite amount of heat. If this heat is confined and allowed to act upon water, the temperature of the water rises. This is the principal of the calorie which is the term given the unit of fuel value. In the same way the energy value of food is measured. In other words, a calorie is the amount of heat required to raise one kilogram of water one degree centigrade. Our whole lists of food have been studied and their values in terms of calories determined. The average adult engaged in a sedentary occupation requires food which will furnish from 2300 to 2800 calories per day. If more than this is eaten surplus fat is stored in the body; if less, nature uses the fat already stored up to make up the deficit in food requirements.

This is the principle behind all plans for safe weight reduction. If less food is eaten than will furnish the required number of calories, the surplus body fat

is consumed. If one reduces his calorie intake to from 1300 to 1500 calories per day instead of eating 2300 to 2800, one may expect, according to authorities, to lose from one to one and one-half pounds of weight per week. A diet which will furnish this number of calories may easily be selected without causing discomfort or annoyance. If such a diet is accompanied by well regulated and directed exercise, flabby flesh should become solid muscular tissue. One should shun the advertised reducing drugs, most of which are harmful and poisonous and should never be taken unless prescribed by a physician, and it is wise not to begin a reducing diet without first having competent medical advice.

From a calory point of view foods may be roughly classified into four divisions. First, the protein foods such as lean meat; second, starchy foods; third, fatty foods; and fourth, foods which are largely water, such as many of the vegetables. Pound for pound, proteins and carbohydrates have equal calorific values. Fat however, has more than twice the calorific value of either carbohydrates or proteins, and this must be taken into account in selecting a diet.

Selecting the Diet

There are other things to be considered besides protein food and energy food. Vitamins, of course, must be taken into account in planning a meal as well as a sufficient supply of mineral salts. If one has decided to reduce his calorie intake to, say, 1400 calories per day, the best usage seems to be to divide it up as follows: 300 calories for breakfast; 300 for luncheon; 800 for dinner.

In selecting a reducing diet fatty foods and concentrated carbohydrates such as sugar and sweets are to be avoided. With these exceptions it is a case of cutting down all along the line rather than elim-

inating any specific article of food. In selecting meats, the leaner varieties should be chosen, and if fish is eaten, it should be remembered that white flesh is the less fatty. Some annoyance may be felt at first from the fact that the appetite is not satisfied with the reducing diet. In such case recourse may be had to the watery vegetables such as spinach, celery, cucumbers, asparagus, etc., which by providing bulk, appease the appetite without furnishing many calories.

Persistency

When once a reducing diet is undertaken it must be rigidly adhered to. It is fruitless to go on such a diet for a day or two and then break into it by indulging in a heavy meal. Under such conditions the charm will be broken. Eating between meals is also taboo, for the calorie intake of the whole day must not exceed the number decided upon. It may be surprising to some to learn that a few chocolates or bonbons will make a tremendous difference in the calorie intake; a quarter of a pound of candy may furnish one-third as many calories as is permitted for the entire day and nearly all the carbohydrate calories needed. The few typical meals given at the end of this article are samples.

Bread not Fattening

It seems to be the opinion of some popular writers that bread, and especially white bread should be avoided in a reducing diet; in other words, that bread is a fattening food. This is far from being the case. Bread is not a concentrated carbohydrate—on the contrary, if made with milk it is one of the most completely balanced of all foods, and is the most easily and completely digested. The average slice of bread furnishes about 100 calories. Bread may well form a prom-

inent part in a reducing diet if it is used as the chief source of carbohydrates and its protein fat and mineral content is also considered. Attention should be called to the fact that many of the so-called reducing breads which in the last year or so have sprung into existence, are no more valuable as weight reducers than ordinary white bread when intelligently used. This is shown very clearly in the articles by C. B. Morison, entitled "Some Antifat Breads", and "More Antifat Breads", which appeared in the October, 1924, and the May, 1925, issues of *Baking Technology*.

In beginning the reducing diet it will be found necessary at first to use a pencil and notebook to keep a strict account of the number of calories eaten, for unless this is done, it is very easy to exceed the limit. After a while one will become so familiar with the calorific value of foods that the pencil and notebook will no longer be necessary.

Six Typical Meals

BREAKFAST	Calories
Banana (1)	100
Lamb chops (1).....	100
Toast (1 slice).....	100

LUNCHEON

Creamed beef (mod. portion).....	200
Bread (1 slice).....	100
Apple (1)	100

DINNER

Meat loaf (mod. portion).....	200
Beets (4, 2 inches in diameter).....	100
Peas ($\frac{3}{4}$ cup).....	100
Bread (1 slice).....	100
Butter (mod. portion).....	100
Peach (1)	100

BREAKFAST

Toast (1 slice).....	100
Egg (1 fried)	100
Coffee (1 cup with 2 tsp. sugar, 1 tsp. cr.) ..	100

LUNCHEON

Cream cheese (2x1x $\frac{3}{8}$ inches).....	100
Bread (1 slice).....	100
Orange (1 large).....	100

DINNER

Consomme (2 cups).....	50
Chicken (2 cups).....	200
Gravy (2 tablespoons).....	100
Rice ($\frac{1}{2}$ cup cooked cereal with $\frac{1}{4}$ cup milk and 1 teaspoon sugar).....	100
Tomato (1) and cucumber (1).....	50
Bread (1 slice).....	100
Butter (1 portion).....	100
Jelly (1 tablespoon).....	100

Calorific Values of Common Foods

The Metropolitan Life Insurance Company of New York has recently published a booklet entitled "Overweight, Its Cause and Treatment." This is a very concise little pamphlet, well worth reading by the over-stout.

In addition to listing many typical meals the calorific values of the common foods are so tabulated that diets may easily be chosen which include a wide variety of readily obtainable foods, and which in a well-balanced manner furnish the essential constituents of a satisfactory and normal meal. A careful study of this booklet will be far more helpful in retaining desirable beauty curves than the purchase of "treatment" which reduce the pocketbook far more effectively than the figure.

More on Amylophobia

ONE of the very best health columns is edited by Dr. Wm. Brady. His answer to an anxious seeker for slimness is too good to remain in journalistic obscurity. So we print it for Baking Technology readers as a contribution to the amusing literature of amylophobia.

REDUCING BREADS

"Kindly advise me how many calories are contained in a slice of so-called reducing breads.

P. C. I."

Depends on the weight of the slice. But the so-called reducing breads contain about the same number of calories as ordinary bread. The reduction, I think, refers to your pocket book."

Return of the Dinner Pail

WAYS to sell bakers products seem to be limited only by the bounds of our ingenuity. "The coming of the sandwich vending machines has precipitated a veritable war around this cornerstone of the lunch business," says the Hotel Monthly. With a well-made sandwich or a piece of fresh apple pie waiting for your dime at any filling station, factory rest room or office building lobby, the baker should welcome the popularity of the sandwich and the typically American taste for pie which seems to be crowding out the old-time luncheon menu. Nor is the vending machine method for foods so new.

It was freely predicted a few years ago that the Automat restaurant could not last, but improved service and more tasty foods have placed them among the list of attractive luncheon rooms in many of the larger cities. A glance through their enormous commissary and supply department is sufficient to convince one of their permanency.

But now the Automat is to be brought to the worker or passing motorist to make it easy for him to indulge his appetite with good and wholesome food in place of substituting candies to tide him over the rush hour until he has time to sit at a table and partake of a more leisurely meal.

Bakers bread in sandwich form, pies and cakes really lend themselves to package distribution in more convenient and more diversified ways than almost any other essential food and it needs only the right commercial interest in the subject to popularize his products.

The restaurant owners' troubles with competition for the noon luncheon began with the decline of the dinner pail. At first the cafeteria seemed to be the logical solution. Then the corner drug store and soda fountain catered to the sandwich de-

mand of those whose lunch hour had been shortened by business circumstances. The sandwich shops which followed have been amazingly successful only because they were able to supply in a variety of sandwiches, pies and cakes the nearest approach to tasty, wholesome and complete food.

There may be a menace for the soda fountain luncheon not only to the restaurant business but to the health of those who patronize them regularly. It is not uncommon in great cities to see the stenographer, the clerk, and the errand boy from across the street making a luncheon out of overly sweet desserts which supply the body's demand for a quick energy pick-up but lack the body building qualities which alone prevent that jaded, tired feeling toward the end of the day. A reserve of stamina is called upon to carry the tired worker through that last hour of the day's work. The meager luncheon allowance cannot be spread over the high cost of soda and sundaes with a sufficient margin left over for a satisfactory sandwich.

While the alert restaurant operators were casting about for some method of meeting this newer competition the dinner pail was rediscovered, but it stages its reappearance in a new custom and under a new name. Instead of the tin container it is a cardboard box. Instead of carrying it from home it is brought to the consumer when he wants it.

The Hotel Monthly tells us about it: "Three or four of the principal operators of restaurants have gone into this branch of catering. They are offering a veritable feast for a quarter. Phoebe, the telephone girl and Maggie, the manicurist, were never able to get as much in their lives for two-bits as they can right now.

"Imagine getting three full-sized sandwiches all containing a different filling,

a dish of salad, a piece of pie or cake, a variety of fruits, pickles, olives and some other surprises for the sum of twenty-five cents. That's what they are giving in the box lunch. The same menu at the lunch counter would cost just twice as much.

"One of the strange things about the box lunch argument is that the drug stores have had to go into competition with themselves. They are selling box lunches and still maintaining their lunch counter service, although indications and reports are that this business has suffered quite materially. There is also a noticeable decrease in the business of some of the cafeterias as a result of the new catering system, which often does not wait for the guest to come for food, but which actually takes the food to the guest."

Staff of Life to Filipinos

Filipinos, prospering under American sovereignty, are becoming bread-eaters. This may be an explanation of their ability to win the far eastern Olympic games. Last year they bought about \$8,000,000 worth of flour from the United States. Prior to the American regime flour for the Philippines came chiefly from Australia. In 1899 only \$66,000 worth was bought from the United States. Now, with hundreds of bakeries in Manila, baking machinery is also bought in America.

"The Institute is doing a great work, and I feel that the bakers and allied lines are appreciating it more and more. Our organizations are 100% sold on the American Institute of Baking, and our men are instructed to boost for it whenever they get a chance. I feel that its work is most essential and that all interested in the industry should contribute to its success.

—Stein, Hall Mfg. Co. Louis E. Leverone."

Huckleberry Pie

HUCKLEBERRY PIE from Mother's kitchen was indeed full of lyric qualities and exultation. But it wasn't altogether the goodness of the pie which made it so soul-satisfying. In those fragrant pies was the aroma of the woods, the beauty of wild pastures, the joy of barefoot freedom, which filled the life of the lads who stripped the ripe fruit from loaded bushes. And in them too was Mother's labor, her cheerful giving of time and strength for her family. No wonder then that home-made pies were richly redolent with the poetry of life as well as the labor of their creators. Those barefoot days are long gone. Pie-baking has lost its charm as a homely virtue. But huckleberry pies are still rich with purple juice, still crisply confined in golden crusts, still a joy to souls and stomachs. But now they come from huge pie bakeries, and the only poetry in their making is the poetry of production which in its own modern way should satisfy the sorrowing editor of the *New York World* quite as fully as Mother's toiling in her kitchen heated by summer days and superheated by pie-laden ovens.

"The pie season is here. All those things of which pie is made can be had fresh and cheap. Which brings to mind a neglected public issue—the deterioration of huckleberry pie. Here is a blot on the national escutcheon. Huckleberry pie, as originally invented, was essentially poetical; it contained that lyric quality which marks off poetry from the utile arts; it exalted the soul, lifted us for a moment from the earth to the stars. There was but one way to make it. The crust was thin and flaky. The berries were used in their natural state. Thus, when the pie was baked, great quantities of juice stewed out, staining the crust a rich purple. Service was in soup plates. Cream

was added until, in juice and cream combined, the pie floated. The diner was allowed a spoon, fork, ladle or whatever he required, and was not debarred from tying his napkin back of his ears. When huckleberry pie came on the table, regular rules were suspended in the interest of art.

Now all is changed. Huckleberry pie has come under the pie baking trust. The crust is no longer thin, but thick; the berries have cornstarch added to them, so the juice curdles into a pasty jelly. No longer is service in soup plates, and no longer do we add cream. The dark purple blots on the crust are a thing of the past. How long shall we stand this outrage? The modern technique may facilitate the delivery of pie in stacks, but it has driven a dirk into the heart of poetry. If we are free men, not slaves, let us rise and demand our rights."

Editorial, *New York World*.

Score Card Appreciated

The official method for scoring bread devised by American Institute of Baking and in general used by the baking industry, is rapidly receiving recognition outside the baking industry.

George A. Stuart of the Bureau of Markets of the Commonwealth of Pennsylvania, is using a supply of score cards furnished him by the Institute in scoring the bread at different state institutions. He says:

"I feel that we should use the score card which seems to have been adopted by all of our commercial bakers and in this way build up a better and more nutritious bread at all our state institutions."

Your Baking Technology certainly contains a wealth of good and useful information.

—Andrew A. Wollin, Chemist.

Books for the Baking Laboratory

RESEARCH ASSOCIATION OF BRITISH FLOUR MILLERS, Bulletin 1, 39 pp. London 1924.

The first bulletin of the new Research Association of British Flour Millers is a highly important and instructive account of the organization and activities of a scientific development that has great potentialities of service not only for the British milling industry but for that of other countries.

The work is divided into three chief branches or parts, the library, or information bureau, the analytical and advisory service, and the research investigations.

The plans for the development of the library have been well thought out, and that section of the report on the "Function and Scope of the Information Bureau, etc." on pages 20-37, are worth the attention of all those engaged in collecting, arranging and abstracting scientific literature for information and research work.

A "clearing house" for milling and cereal knowledge is the end in view and if Dr. Jones who is in charge of the work, is able to even approximate the task he has set out for himself, he will have attained more than a measure of success.

The literature of the cereals, and of milling and baking, is most extensive and widely scattered through all kinds of sources, and has been greatly extended in the last ten years, so that classification and summarization is inevitably time consuming.

The analytical and advisory work, and also the plans for research are discussed by the Director, Mr. E. A. Fisher. These departments of the Association enter fields similar to those of other institutions engaged in cereal work and echo a familiar note.

Plans are also discussed for the location of the laboratories and other equipment. An experimental bakehouse, mill, and conditioning oven will be established for research purposes.

The mill and the bakery appear to be well coordinated in the research work that is planned for the future, and the recognition that milling and baking progress are closely connected seems to have been appreciated by those responsible.

The future progress of this latest industrial association to enter the scientific study of its problem will be closely followed by all those who are interested in milling and baking, as the first bulletin is full of promise for the future.

C. B. Morison.

Abstracts of Technical Articles

Selected for Baking Technology from Chemical Abstracts

Gluten percentage in some American and Italian wheats. P. Altomani. *Giorn. Agr. della Domenica* 34, No. 5, 38 (1924); *Intern. Rev. Sci. Practice Agr.* 2, 367-8.—To ascertain whether, or not, Italian grown wheat should be mixed with American wheat (to increase the gluten content of the former and make it more suited to bread-making.) Altomani carried out a series of analyses, the results of which show that as a rule, American wheat does not contain a perceptibly larger percentage of gluten than Italian wheat, and indeed, some varieties of Italian wheat are superior to the American product in gluten percentage. Italian flour satisfies all the requirements of the baker as regards quantity, and especially quality, of the gluten present. The Italian grain studied contained gluten of as good quality as any of the American wheats with which it was compared. The following values are given for moist gluten, dry gluten and protein substances, (N X 6.25), respectively: For 1922 crop: Gentilrosso (48) 33, 11.0; Inallettibile (96) 37, 12.0, 13.81; Rieti (11) 38, 12.6. For 1923 crop: Manitoba No. 1 (American) 38, 12.4, 1.4; Manitoba No. 2 (American) 35, 11.4; Azima (Russian) 40, 13.0; Cologne (grown from seed) 32, 10.8; Gentilrosso (grown from seed) 25, 8.8; Gentilrosso (family 48) 32, 10.2; 12.50; Inallettibile (family 96) 34, 11.0, 12.98; Rieti (family 11) 38, 12.2, 13.65.

H. G.

Conversion tables for calculating the absorption of flour to a 13.5% moisture basis. A. W. Meyer. *Cereal Chem.* 2, 42-6 (1925).—Conversion tables for calculating absorption to a 13.5% moisture basis are given for flours containing moisture from 9 to 14% at increments of 0.1%.

Ruth Buchanan.

The effect of fineness of grinding the sample on determinations of fat and crude fiber. R. F. Korphage. *Minn. State Dairy and Food Comm. Div. Feed Insp. Ann. Report*, 4, 32-8 (1922); *Expt. Sta. Record* 51, 317.—Data are reported on the fat and crude fiber content calculated to the dry basis of 2 samples of bran unground and ground to pass 10-, 20-,

30-, 50- and 60-mesh sieves, and of samples of alfalfa meal and beet pulp unground and ground to 50-mesh. The results showed in general an increase in the figures for fat and a decrease for fiber, with increasing fineness up to the 60-mesh, when the results became variable and inconsistent. Considerable differences were exhibited by the various materials in regard to the effect of fineness of grinding, but the results as a whole are thought to justify the recommendation that all feed samples on which fat and fibre are to be determined should be ground to pass at least the 50-mesh but not the 60-mesh sieve.

H. G.

The determination of moisture in wheat and flour. III. Harry Snyder and Betty Sullivan. *Ind. Eng. Chem.* 17, 311-4 (1925); cf. C. A. 19, 544.—The Brown-Duvel method (heating in a hydrocarbon oil) for determining moisture in wheat can be standardized against the water-oven method to give comparable results. It is not satisfactory for use with flour. The double-walled distillation flask method is too intricate for general industrial use. The moisture content of flour found by different methods was: double-walled flask 12.9%; water-oven 12.5%; vacuum-oven (100°, 400 mm. mercury 5 hours) 14.30%; 1 hour in electric oven at 135° 14.40%. In 9 determinations on flour, the average values by the double-walled flask and vacuum-oven methods were 0.52 and 1.94% higher, resp. than by the water-oven method.

C. G. King.

Flour from cereals and other starchy products. R. Osmundsen. *Brit.* 222,819, Oct. 3, 1923. Flour or dough is prepared from a starchy grain material containing a large proportion of sugar and dextrin produced by the action of enzymes contained in grain, mixed with starchy material from other sources such as potato pulp, potato starch or corn starch. Rye, other grain or flour may be maintained at 10-30° until the desired % of sugar has been produced and an extract of bran made with a solution of salts may be added. The product may be used for bread-making.

Determining moisture in grain, flour, tobacco, etc. H. Rowlands and H. S. Setter. *Brit.* 223,951, March 29, 1924. The moisture content of a specimen of material is determined by drying it on the scale pan of a steelyard which is suspended in a drying oven. A pointer on the steelyard arm may be arranged to give a direct moisture content reading.

The composition of crude gluten. D. B. Dill. *Cereal Chem.* 2, 1-11 (1925).—Details of experiments are given to show the nature of the non-protein constituents of gluten. Analyses of a red wheat flour and of gluten obtained from it showed that 5% of the total protein, 1/2 of the total lipoids, 1/6 of the ash, 1/5 of the total P_2O_5 and 1/4 of the lipid P_2O_5 which were present in the flour appeared in the gluten. There was no evidence to indicate that the starch in gluten acts other than as an indifferent filler.

Ruth Buchanan.

Bread-making. J. E. Pointon. *Brit.* 223,446, Dec. 1, 1922. In making bread by the sponge process, a single receptacle serves for containing the dough ingredients as they are mixed together and for containing the dough during its subsequent treatment mechanically until it is ready to be divided into loaves. The receptacle and contents are transferred successively from and to different apparatus which operate upon the dough.

Food product containing malt extract, honey and baked bread. W. B. Fink. U. S. 1,528,820, March 10. Baked whole wheat bread 16 is formed into a dough with lime water 1, malt extract 2, and honey 1 part, the dough is shredded or otherwise subdivided into particles which are then toasted to effect dextrinization of the flour of the bread.

Foods and other products from yeast, etc. M. Kahn, E. LeBreton and G. Schaefer. *British.* 225,228, Nov. 20, 1923. Yeasts and other microorganisms, such as *amylomyces* and *Rhizopus*, are autolyzed and treated to produce food products for human beings or for animals and residues suitable for the preparation of "greases." Brewers' yeast is treated with Na or NH_4 carbonate and then with HCl to remove bitterness, then autolyzed in vats with NaCl at 36-44°, mixed with H_2O and the liquids and solids are separated. Other organisms are treated similarly for autolysis, which, however, is carried out in the presence of alcohol or an added antiseptic. The liquid, concentrated in vacuo, constitutes a food and the solids are mixed with fats, soaps, etc., to form "greases." Distillation of the liquid produced from yeast, in vacuo, and at a temperature not exceeding 70° yields an antiseptic from which fatty acids may be removed by extraction with ether or petroleum ether and which may be concentrated and added to other products to be autolyzed.

How our Graduates Benefit by Learning

THE best measure of any school's value is the record its graduates make for themselves. And every step ahead which is more surely taken because of the lessons learned in the classroom is interest on the investment of time and hard work. The record of the men who have been students at the School of Baking is already one to be proud of.

The day by day deeds of our Alumni are nowhere so well recorded as in *The Dough Chute*, which under the clever hand of Victor Marx, pours out every month a well mixed and leavened batch of achievements of the men who are out in the bakeries of every state proving the value of the training they got in the experimental bakery, the shops, laboratories, and classrooms.

In the three short years since the School gave its first course, 277 men have completed the courses and gone out to leaven the baking industry. Of this number, so *The Dough Chute* tells us, 244 or 92 per cent of our students are back in the bakery and allied trades holding responsible positions as managers or superintendents of bakeries, or making efficient sales and service men.

These men out in the field are our most helpful Alumni for they find as they go from bakery to bakery, young men who also need training and they tell them their experiences and inoculate them with the wish to secure the same valuable training.

They are working to build a greater baking industry by organizing the efforts of its individual members, and whenever they find a baker who has little use for his local association and no appreciation of the great work the National Association is doing for him, they find ways by which

they can make real workers out of self centered individualists and take into shops which have never known the value of standardized raw materials, the results of tested flours and bread scores from the Service Laboratory of the Institute.

The Dough Chute is a record of the rapid progress of Fishburn from the doughroom of one plant to a superintendent's job in another and then to greater responsibilities in a third large plant. It tells how Amidon left his trouble shooting to go to South America to interest the bakers of the Latin countries in the virtues of our strong flours and how the success which his training brought him soon sent him off on other journeys in the search for new markets. It records the successes of Winfree and Blais and Velasco, who took back to their plants better methods of production which so improved their business that they are now bigger bakers. It prints the story of Lou Abrams, who has gone on from one responsible position to another, always climbing upward to greater opportunities and always making good through the training his school gave him.

Out in ten thousand shops men are working by rule of thumb. They are called bakers because they know how to handle doughs on the bench. They are worthy of greater responsibilities but they cannot accept them because they are untrained. It is such young men as these who should be planning to get their records into *The Dough Chute*. And the way is their's to hew out. The only requisite for admittance to the Alumni group is enough energy to start the course in the School, enough perseverance and pluck to finish it and then enough salesmanship to sell himself into a real position.

BAKING TECHNOLOGY

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in Baking*



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A Presidential Message^{*}

TODAY as we celebrate our twenty-eighth birthday, it may not be out of order to take an inventory on this birthday, and then look back to our first birthday and see if we are satisfied with our progress. Twenty-eight years ago there were 12,000 bakeries employing 55,000 people, with a total invested capital of \$80,000,000. Today the census tells us we have 18,572 bakeries employing 127,498 people and the enormous investment of \$417,000,000. This is gratifying, but should not be satisfying, because one must compare the changed times of today, also the modern home of today with the home life of that period.

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Twenty-eight years ago 80 per cent of the families baked their own bread; today 40 per cent are still baking their own bread. Therefore, why should we worry over what our competitors may be doing when this amazing number of choice prospects are before us? To me, one of the important functions of American Bakers Association is to help educate this 40 per cent to the true value of the bakers' product, and along this line

our greatest efforts are being placed. The bakers at large can assist this work in two ways: first—support the work of American Bakers Association, which is organized for their protection and good; sec-

^{*}Delivered at American Bakers Association Convention, Buffalo, Sept. 15, 1925.

ond—make better bread in order to satisfy and please the consumer, who has been told of the highly nutritive quality of the loaf of bakers' bread of today.

I am not going to take your time telling of the work done at Chicago during the past year, but rather I shall tell you in my own way, as I see it, of the progress made for our industry during that time.

American Institute of Baking

When the few "bold" pioneers, who developed a National Association of Bakers, first saw the vision of its necessities, they saw a nation of bakers, each one of whom sold his product near its place of manufacture. Hence, they saw that a national association had to deal with merchandising morale and not with the baked products themselves. These leaders of the baking industry could not follow the California orange growers who merchandised through a single center, and built an organization to sell oranges that was world-wide in its contacts. But they could organize a national association that would sell morale for bakers through world-wide contacts. In such a hope our industry set up the American Institute of baking. It was to be mistress in its own realm of service for the baking industry. It was to be a focus for problems within the baking world and a broadcasting center to establish contacts with sister industries, with the press, with the government departments dealing with bakery affairs, with the public, with the baking industries of other nations, with the home economics and nutrition workers, with bankers and financiers, who wished to know the facts of the industry's importance, and with librarians and book collectors, who wished contact in the field of bakery literature. For five years the Institute has gone upon its way. Let us in-

quire into some of the various contacts it has succeeded in making and let us see how these have worked for the good of the whole industry.

The School of Baking

Since our last convention, three full classes of thirty-six students each have been graduated and, while this number is only partly satisfying the demand, the fine success most of these men are having in the field after graduation is convincing to us that our curriculum and method of training must be of the best. Our only weakness, as I see it, in our present school work, is our limited capacity for taking on additional students for each class, but I will come back to this question of expansion again a little later in my talk. But, this school is your school and, as the best advertisement for your loaf of bread is your loaf of bread, so our best proof of value of the school is in the continual enrollment of students in each new class by bakers who have in their organizations at the present time one or more students who have previously taken the work.

It seems to me that we have just now begun to establish ourselves and the growth has been a healthy one—the baby is now five years old, and like most babies of the same age, it is crying for more food. If we are successful in maintaining healthy nutrition, we ought during the next few years to bring the child to a strength consistent with its age. I might develop the thought further, but the child is a long way from maturity.

The Laboratories

The Service Laboratory is gaining in popularity every day and the increased number of loaves being received at Chicago each month for scoring is indication enough that bakers are interested in this service and are watching their bread and constantly striving to better their score.

The Research Laboratory is possibly the most misunderstood of all and the slowest to show results, but this laboratory has paid big dividends to the baker already and its cellar is full of information for the baker and it is developing startling conclusions which will benefit the baker of tomorrow.

The Nutrition Laboratory needs an entire paper to correctly handle it, but here the facts are proven and our defense for bakers' bread is built on the results of the findings of this laboratory in their feeding tests and the scientists, universities, nutrition writers, etc., are watching each of our experiments.

Lay Magazines

For a year after the institute opened its doors the National Magazines filled the editorial office of Baking Technology with reject slips. Mr. Russell gathered enough to paper his walls, for they were familiar with a form of industrial publicity that consisted of falsehood glossed over and that would not stand fire. The articles sent out were so sent because their author believed them sound. Finally, one magazine and then another printed bits and editors began to wake up. Nation's Business accepted a story splendidly glorifying the baking industry. It told of its progress from craft to industry and of the development of machine inventions. The result was a deluge of requests from magazines. From that time on the road was open to practically all National magazines. Articles from the Institute appeared in Nation's Health, in Good Housekeeping, and in The American Food Journal. This contact is now wide open and is working for the industry's welfare more than ever. The Rotary Magazine, for instance, printed a story on the industry's Rotarian Presidents, which was reprinted five different times by such papers as The Armour

Journal, and the press of allied industries. Besides the general magazines, the periodicals of the meat industry, the laundry industry, the Hotel World, the restaurant men, and the organized advertising groups, all picked up with the copy from the American Institute of Baking and used this copy in a way to gain morale for bakers' baked goods.

Public Officials

Public officials have always found it popular to pester the baking industry. If it wasn't on price, it was on charges of unsanitary conditions, or weight, or labor matters. Most important, however, was their discovery that the baking industry was leading in its own sanitary ideals and then the public officials ceased to throw bricks. They brought cases directly to the attention of the Institute so that co-operation from within could bring about a change rather than public pillorying from without.

The Special Writers

Special writers formed a group it was very hard to deal with. Many had found the Anti-White Bread Propaganda a fertile field to work in profitably. As the industry itself was without data on which to make some sound answers, they went unrebuked for a time and their numbers waxed numerous in the land. Some magazines were even started on the idea that white bread was poison and dramatized this idea in a most unscrupulous fashion. They had to be answered, but how? A Nutrition Laboratory was built and equipment installed that made it one of the first laboratories in this field. As soon as experiments in each field were completed. Baking Technology published the results. These showed white bread to be the world's best energy food and that it should be eaten as it practically always is, as a part of a meal balanced with milk

and green vegetables. By allowing animals to eat each staple food by itself and proving that they died on each staple more quickly, in most cases, than on white bread, all the sting was taken out of the growing cry that "white bread kills." When those using it had to admit that when fed alone apples also killed, spinach killed, butter killed, whole wheat killed, and milk killed, it became time to insert a little laugh in place of the over-zealous crusading. One by one the special writers were brought over by the sheer weight of sound data. They appeared at the Institute, brought there by curiosity, to learn more of the new nutritional knowledge. In this connection "Romance of the Holes in Bread" was written by I. K. Russell, and it found instant acceptance among chemistry teachers in the high schools and scientists generally, who wished the scientific viewpoint written in such a way that lay folks would understand it.

The Lay Press

Contacts with the lay press came next in order of importance. Editors were like public officials in that they thought of bakers as an unorganized craft whose members could be assailed at will. But the Institute subscribed for a clipping bureau and every attack drew an answer. Generally it was found that well meaning editors had simply been fooled on their facts. New facts were welcome. One after another, editors were converted from foe to friend as letter after letter was sent to them taking up their differences and laying down all available data on each point raised.

Some Conclusions

These, then, roughly are the contacts of the Institute merely glanced at in a bird's-eye fashion. We have only touched the more obvious points. With other industries the national home of the baking

industry is weaving its story and its life into the warp and woof of our present industrial fabric. That's the way our activities have loomed up on the outside. But how about it on the inside? The answer to this question is to be found in the attitude of the average baker to the institute and its work. Is it really your national home in your mind? Is it alive to you and are you alive to its services? Do you make use of its resources? Do you contribute to its support? Are you part of it in other words, or are you letting it go it alone so far as you are concerned or care? The most deadly foe for progress is the constant sense the institute staff have that only a few hundred support them where thousands should be marshaled to that end.

Still Advancing

The vision of the founders of American Bakers Association was not confined to the inside of the four walls of our building at Chicago, but always with the idea of using this as a nucleus and then advancing and to this end less than two years ago the American Society of Bakery Engineers was organized. And to me it points a step toward the real objective for which we are striving. I predict for it a great growth, but might safely add this word of caution.

American Society of Bakery Engineers

This organization is still swaddled in its baby clothes, but the next few years are going to develop this infant to a real giant as far as the baking industry is concerned. Nine out of ten successful societies or organizations are made within the first two years of their existence or are killed during the same period. The soundness of their idea and the necessity of the organization means expansion. Just how great this expansion will be and can be to the engineers themselves and

to the industry at large depends upon the sound principles for which the organization will stand.

I think in the first place that the value of the society in years to come will be determined by the standard it sets and those standards must be set now in its youth. The fact that bakers only recently stepped out of their craft makes it necessary for us to be very cautious. If we lose our step the Society of Bakery Engineers will be joked about. If, on the other hand, the original thought that membership should be reserved to men who have actually accomplished something in bakery engineering and who have graduated from recognized schools, is carried out we are in no danger and can build on a substantial foundation. I think it is far more important to go slow than to develop a "mushroom growth" which, while it brings the society considerable money in the form of dues, will burden us in the end with ill-assorted membership. The organization of the Society of Bakery Engineers is in itself a sure sign of expansion to the baking industry. It should not be allowed to stifle or be hampered in its work.

Trade Promotion Section

Early this year, under the auspices of the American Institute of Baking was held the Trade Promotion Conference, with the primary object of telling the baker's story to the bread earners and bread eaters of the country. It should bring to an end the old hocus about advertising. And a study was made not only of the writing of advertising by the baker (that is easy) but the writing of their advertising and the handling of their advertising in such a way as to bring results and leave nothing for the consumer to guess at. We all realize that it is useless to try to tell the child that bread is energy food and the fuel the body must

burn to thrive, but by re-shaping the story in the form of pictures of rosy-cheeked, healthy children, who got that way on a diet that included bread or milk, or bread and its various spreads or sandwich fillings, is the important way.

The conference held was a wonderful conference. Of the 108 registrants, 28 were speakers, trade paper representatives and guests; 73 were members of American Bakers Association and but seven were non-members. It is such group meetings as this which convince us that the association and the institute have finally secured recognition.

It is hoped that everyone in attendance at Buffalo at this time will attend the meeting of this important section which will be held in this building tomorrow afternoon at 2 o'clock. Obtain for yourself the other baker's vision and ideas on increasing his sales.

Pie Bakers

It was impossible to expect when the National Association of Pie Bakers decided at Atlantic City one year ago to join the National Association that we would be successful in landing all of these members and the number of new members we have added to the association the past year from the ranks of the pie bakers is very pleasing. Just as quickly as the pie baker really understands how much of a support the American Institute of Baking is to him, not only in solving his problems, but in defending his goods from the attacks of the critics then will he want to lend his support to a greater expansion of this work. We believe that from the results of our first skirmish with the various food experts and dietitians who express their views so openly and frankly against pies, will begin an absolute orderly retreat of these same good people, if the American Institute is able to show them how absolutely wrong they

are in their belief that pie is not a wholesome and healthful food.

If the baker manufacturing pies does not yet believe that the American Institute of Baking has been of service and assistance to him it would be worth while to read the articles prepared by Mr. Shaw of the American Institute of Baking and published in some of the following magazines: The Modern Restaurant, The American Restaurant and The Mid-West Hotel Reporter. Was this possible one year ago before the contact was made with the Institute?

The Cake Baker and His Problems

It would be misusing the time, the place and the subject not to say something in behalf of the cake baker and his problems, and I trust that the cake conference to be held on Wednesday afternoon will go far in submitting suggestions to American Bakers Association and the Institute of Baking that will permit us to intelligently serve the cake baker as we have the bread and pie bakers.

Undoubtedly, the reason for the tardiness of the association and the institute in making an effort in behalf of the cake baker is because there have been so few individual cake bakers, who were not well able to care for themselves, so that there was little service the institute could render. But with the tremendous growth of this branch of the industry in the past several years has come the desire of the bread baker to encourage this department in his organization, because of the splendid opportunity for selling bread and cake together and completing a properly balanced food diet that, when properly presented to the housewife, makes for a lessening of home baking and adds opportunity for a better return on the investment of the baker.

However, those bakers who have paid

little or no attention to the baking of cake, looking on it as a sort of "filler-in" and not worthy of intelligent study, awakened suddenly to learn that the art of cake-baking is a real science, safe only in the hands of experts, and unless the perfect cake is baked their opportunity for pleasing the public is nil.

Therefore, the recognized leaders in the scientific art of baking cake have unselfishly subscribed their services to this convention by holding a Cake Conference, that will intelligently start going the machinery to enlighten the Institute of Baking with the best information available for cake-baking, and through it inform interested cake bakers on how and why it should be done—just another service that should make every baker in the United States want to be a member of American Bakers Association.

Educational

The program of the industry for the years ahead must concern itself chiefly with increasing consumption. This will come only with a better appreciation on the part of every consumer, both of the quality of bakers' products and of the high service rendered by the baker as the manufacturer of our most important food. In the development of this program American Institute of Baking hopes to lead. The volume of work we are now carrying on is far greater than ever before in the history of the Association. The success we are meeting in our efforts to build up a greater baking industry is more apparent than at any other stage of the baking history. The position the baker now occupies in the business world has lifted him out of the rut into the rank of foremost business men.

Attacks

If the milling and baking industry ever had any reason for organization it is right now. I am the more convinced daily, that

our industries should be just as interested in defending themselves under attack as in discussing the larger problems of constructive growth. Unless we can defend ourselves we cannot grow. As the days go by I am reaching a definite conviction that most of our troubles are not troubles at all but misunderstandings. Those who are supposed to be our enemies simply do not know us or our work and those who criticize us do so without knowledge of the facts.

Vigilance Section of American Bakers

Is the time not ripe for American Bakers Association to organize within itself, and through the co-operation of the Government, a Vigilance Section? We have been nursing our industry and our position in the scientific world and our right to defend our goods steadily for the last number of years. The proofs are in our hands and are part of our records. From now on when mis-statements are made about bread can we not place ourselves in a position that we can prosecute rather than carry on our previous necessary course of writing a letter to the individual making the untrue statement and asking him to be careful of what he says?

Leadership

I am taking the position today that American Bakers Association is the leader. My own feeling is that American Bakers Association has been too modest, perhaps too fearful in its work. When groups of bakers have been afraid of us we have deliberately drawn out of their way in order that they would not be frightened and whenever trade papers, or millers, or machinery men, or yeast companies have felt that they should play softly when discussing our work, we have let them do it. But from now on I hope this condition is past. I am not blushing

for anything that has been done by American Bakers Association in the past year. We have made mistakes, and are sorry, but nevertheless we are proud of them because whenever we did make a mistake we were doing something or the mistake would not have happened.

The foundation for an association to support a great industry like the baking industry has been carefully laid during the past few years at Chicago. Let's allow this foundation to bear our weight and support us in defending our industry.

I have been fearful during some of the last few months that some of the bakers are feeling utterly lost with the rapid changes in our industry and possibly a bit doubtful of the value of the jewels the strong box of the future contains, and a bit weary perhaps in looking toward the day when so many obstacles will not loom up ahead. But when we realize what has been accomplished in just a few years and the foundation that has been made for the work of the future, then it does not look unsurmountable.

The Present School of Baking

The present equipment and facilities for instruction in the school are limited and inadequate for any future expansion of the regular course of sixteen weeks. It is impossible, with our present physical equipment to offer additional courses, unless a new building is to be erected and provided with facilities for taking care of the required developments, and this should be planned and built to care for the next twenty-year period. The planning of a new building should be based upon the immediate needs of the baking industry in relation to what is being done and what can be done with our present facilities. Our experience so far tells us exactly what we can do at the present time. The future program can be based on our past experience.

Sweet Goods School—Pie Baking Department—Cake Baking Department

We hear talk from all sides from pie bakers wanting their bakers of tomorrow educated and taught in the proper way of making pies. The same cry comes from retail and smaller bakers making sweet goods.

The cake bakers' problems are serious and they are asking for recommendations from the American Institute. But I am classing these three departments under one head, and they should be organized as one department of the school with its special bakery laboratory and class rooms. The course should be arranged to admit students who might be interested in only this part of their development and it should be also shaped to admit students from the regular bread making course on conclusion of the required work in that department, or made a part of the regular course by the addition of further time to the regular four months' period. This department might also function as a short course school exclusively. I am believing that the pie baker is also interested in sweet goods and cake—the cake baker is interested in pies and sweet goods. The production of any one of the three items is so closely related that the study of all three could very definitely be made in one department of the school. There is a possibility that this department of the school might become a competitor of the bread department, but that need not be a part of our worries at the present time.

Distribution

Baking executives are giving more and more time and thought to the proper education and training of their employees in merchandising and distribution. Practically every large bakery organization has had to establish courses of employee training to hold its place with competitors and other food industries.

With the unlimited talent available to the Institute and the facilities for gathering all information, the logical place for the training of leaders in bakery merchandising methods is in the School of Baking.

This course can be made variable in length, to meet the needs of the student, including the subjects of Bakery, Accounting, Sales Methods and Salesmanship Training, Advertising, Sales Promotion, and Public Educational Work; in short, all subjects having to do with merchandising, advertising and distribution.

Such a course was proposed at the first Trade Promotion Conference at Atlantic City, was discussed again at the second Conference in Chicago in February, and is now in the hands of the Institute Committee for introduction into the school as soon as space is available.

The Women

The time will come when a consideration must be given to the work of instruction and education of women at American Institute of Baking. There are several thousand young ladies leaving colleges each year with a thorough knowledge of the principals of nutrition and home economics training. Hundreds of them are looking for connections with industrial concerns. A few weeks' special training in a short course at the Institute would give them an understanding of the baker's importance to society and fit them for a position in the outside field. Cannot you imagine the powerful agents they would make for the increased consumption of bakers' products? There is at present no other source of training which fits these young women for the specialized and much needed application of home economics education for the baker.

Association Executives

American Bakers Association will not

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be delivering its maximum of service to the industry or the public until every baker is within the radius of a local organization which is in turn a part of the state and national body. The effectiveness of the local or state group depends upon the abilities and experience of its secretary. An untrained secretary is a liability instead of an asset. He is forced to meet the development work of and co-operate with the highly trained executive secretaries from his Chamber of Commerce, local business organizations, and industrial competitive associations. Without training in the way of his own industry, he cannot efficiently co-ordinate the work of his local group with that of the national association, nor make full use of his opportunities.

Forming our judgment from the success of the National School for Commercial and Trade Executives and from the benefits to all industries participating therein, it should be the policy of our school to hold annual short courses for the training of our association secretaries at headquarters. Those people will thus become thoroughly familiar with the policies and workings of their national body and be able to translate all service into terms of the local bakers contact with his consumers.

Public Education Department

Perhaps the greatest need of the baking industry is for a comprehensive program of professional and public education on the value of bakers' products in our dietary scheme, before our cause has been done irreparable injury by the harmful propaganda of food faddists and by the competition of other food industries which are devoting so much of their effort to educational propaganda and advertising.

While our present work along these lines is bringing splendid returns, it does

not cover the field, and cannot do so until material is prepared in quantity which uses all available science, information and talent to increase the public's appreciation of bakers' products.

In addition, the Institute should offer a course to prospective instruction in baking for vocational and trade continuation schools. We have brought this to the favorable attention of some of the members of the Society for Vocational Education.

During the coming year we should obtain information on the extent and character of the courses given in trade and continuation schools throughout the country that have anything to do with baking.

As far as we know this information has not yet been collected and summarized by any one.

It has always been our hope that the Institute may always occupy a commanding position in the specialized field of technical training in baking when the nation's educational agencies are surveyed for the purposes of eliminating duplications of effort and overlapping of courses of instruction. In this vicinity particularly (Chicago and the Middle West), we should aim to work out relations with the various schools and universities so that the mutual problems of special instruction by those best qualified may be clarified.

I have given you my vision of the opportunities which lie ahead of our industry and I have tried to show you how American Bakers Association through its Institute, can lead the baker into the promised land. In the year I have served you as your president I have come to see our problems in a clearer light and to believe that our association can solve them. Our greatest need is for faith—faith in our industry and faith in our association. We shall keep the faith and the vision I have given you will become a reality.

—Lewis F. Bolser.

President American Bakers Association.

BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

H. E. BARNARD, Editor

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We Work Together

To win through knowing our markets and developing their full potential possibilities, a higher place for the baking industry in the great family of America's business life.

Our Harvest Time

THIS is written on the eve of the Buffalo Convention in the thought that this convention has a message, not only for those who attend, but for those who for many good reasons must stay at home.

Bakers will meet at Buffalo for many different reasons; some accept this opportunity to enjoy their vacation and they will be interested principally in the entertainment features and the privilege and opportunity of meeting fellow bakers and allied tradesmen. Others, and these are in the majority, will go to Buffalo, not because it is the convention time of their industry, but because they will have the opportunity of filling their minds with new ideas and seeing in operation the very latest in machine science and to them dividends will come back in future years. Many thousands of dollars have been spent by the equipment and supply people in placing this feast before the bakers, and the baker is spending his time and money to partake

of this banquet. Will it be possible for him to assimilate all that is placed before him?

To Those at Buffalo

You will be looking for new ideas at Buffalo—they will be before you. Their importance may not particularly appeal to you at the moment. Every man knows that it may be ten or twenty years before the lessons learned at school stand out and proclaim themselves. Then, suddenly an emergency arises. The facts he was taught at school spring up from their place in his subconscious mind and he has the answer.

For every department in your bakery, men have been perfecting devices for your use. They bring these to Buffalo. A sudden need occurs a year later and you know just where to reach for what you want. It is so with your mental machinery as well as your dough mixers. Mental ideas wear out—they need renewal; and to those at the convention, Buffalo, center of the world's electrical power, will be for them a great re-charging station.

Many of the benefits of the Buffalo Convention may not come back to you the first week or the first month after you return home but beneficial results are bound to come back to you many times after the convention is history.

To the "Stay at Home"

Not every baker is able to leave his plant and mingle with his fellows of the baking industry at Buffalo. It is my plea to those who, for many good reasons, found it necessary to stay at home, to watch what those "go and mingle" and "go and learn" boys find out. Talk to them when they come back and absorb all the ideas you can. The day of secrecy and shop jealousy is over. If you cannot attend the convention, talk with the man who went and drain from him all you can get.

LEWIS F. BOLSER.

President.

Standardizing Our Industry

THERE has been no attempt to standardize bakery formulas in an effort to level, up or down as the case may be, such individual attributes as bread quality. Nor will the baker soon find any opportunity to share the benefits which other industries have obtained by the cutting down of varieties or the adoption of standard units of shape and form. Bakery products, like styles, must change frequently in order that the consumers' taste does not become satiated. And every baker will continue to find the demand for his goods influenced by the varied appeal which he mixes into his doughs, tucks between the crusts of his pies, expresses through the designs of his cakes and pastries.

But there is a great need for certain standardizations of bakery practice. That has never been better shown than by the survey of bakeries recently made in Indiana and elsewhere reported in this issue.

When but one bakery out of 150 examined can be scored excellent and when the number of fair and good plants is as 67 to 74 there is certainly a crying need for the standardization of sanitary methods in shop operation and the adoption by the industry of some efficient method by which it can be relieved of the burden loaded on it by the baker whose methods are in violation of the laws of sanitation and a crying protest against the taking over of the business of baking from the housewife. The fact that most bakery goods are now produced by the shops where high ideals are lived up to is probably appreciated by the consumer. And yet there must be much of the *laissez faire* attitude among women when their patronage is still sufficient to support the irresponsible baker who is constantly in trouble with the sanitary officers and just as constantly a black mark on a progressive and forward looking industry.

One of the most difficult things in society

is the policing of its members. And when it becomes necessary for industry to set up rules for its own conduct their enforcement becomes a serious task.

There is, however, one effective method of dealing with this depressing situation. And that is a rigid enforcement of every law which has been set up for the bakers' guidance in sanitary matters. If every sanitary officer of every state and city determined today to clean up the food producing establishments under his jurisdiction, and set about it, cleanliness would become the standard practice. The fact that there has been a great change for the better during the past decade is no reason why any leniency should be asked today. If the baker cannot standardize his formulas, his pans, his delivery methods and accounting systems he certainly can standardize his sanitary ideas and put them into practice.

Stowaways

IT is possible that some men who have made useful citizens came into the land of their choice as stowaways. They perhaps had no other way to cross the ocean and so they took the risks and hid under the cargo of the ship which brought them to opportunity and prosperity.

In every industry there are stowaways who hope to ride to success without paying their passage.

In these days of rapidly developing industry in which the baker is taking so prominent a part many men are content to let others do the pioneer work of planning and building the roads which lead to increased consumption, of driving out the enemies who tear down with their criticism, of laying the strong foundations of science and education. But this condition must pass. The fertile fields of opportunity which the baking industry is finding ready for the harvest will not be gleaned by stowaways.

Bakeries Critically Surveyed

A Cross Section of the Bakeries Operating in a Typical State, Showing Their Materials, Methods and Sanitary Conditions

By HON. I. L. MILLER,
State Food Commissioner of Indiana

Before the baking industry can hope to complete its conquest of the consumer market it must be prepared to meet every requirement of the housewife whose work it is taking over. Those requirements are definite and tangible. They are written into the laws of our states and cities. They are known to every one. The survey of bakery conditions here reported by Commissioner Miller should be studied by every baker and interpreted in the light of his own methods. If his practices entitle him to the rating of "excellent" he is a worthy baker. If he falls below the high ideals set by law and essential to the complete satisfaction of the public he is falling short in his duty to his patrons and to his industry. This survey shows that the baker uses good materials and good formulas but that his housekeeping and business methods are still far from ideal.

FOOD industries and food control departments have greatly changed during the last decade. Officials have exercised their police powers less and less and have emphasized instead the adoption of constructive policies of co-operation with the industries which have laid aside their rule of thumb methods and adopted methods based upon the results of scientific investigation. In the midst of this progress it is well occasionally to take stock of just what has happened. With this thought in mind a survey of the baking industry as it exists in Indiana was undertaken. The consumer purchases his bakery products with the confidence that harmful adulterants have been eliminated, that they are reasonably clean and that the label and appearance of the goods tells him the truth. Such a survey should show if this confidence was founded upon fact.

Indiana bakeries have been under strict sanitary inspection for many years but the records of such inspection indicated but little as to the character and quality of the raw materials used in the shop.

The survey included 150 bakeries rang-

ing from the smallest retail to the largest wholesale bakery, located in cities and towns in every part of the state. While this number is only about one-fourth of the bakeries in operation the survey constituted a representative "cross section" of the industry. Although the survey was intended primarily to obtain information as to the character and quality of bakers' raw materials, a careful sanitary inspection of the plant was made in each case.

The special report form used in the survey of bakers' stocks included the following items: Kinds of products baked; color; cream puff fillers; dried fruit; eggs; fats; filler (pie); flavors; flour; fruits (fresh and canned); icings; jellies and jams; malt; marshmallow; milk; nuts.

The results of the survey as it relates to these items is summarized briefly as follows:

Kinds of Products Baked

Eight of the 150 bakeries baked bread exclusively and one baked only pies. The remainder baked two or more products including bread, pies, cakes, doughnuts, crackers and fancy pastries.

Color

One hundred and twenty-three bakers used food coloring in one or more products. The most popu-

lar colors were red, yellow and green, in the order named, used by 105, 101 and 48 bakers respectively.

Dried Fruit

One hundred and twenty-five bakers employed some form of dried fruit. Raisins found in 124 bakeries were by far the most popular. One baker used apples, three apricots, one figs and 7 currants.

Eggs

Eggs were used by 141 bakers. Fresh eggs were found in the stock of 114 bakers, storage in 39, frozen in 38 and powdered in 36. Often two or more forms of eggs were found in the same stock. The variety used seemed to depend largely on the season of the year and the price.

Fats

All bakers of course used some form of fat or shortening agent. The store rooms contained vegetable fats or compounds, butter, lard, margarine and oils, their prevalence being in the order named. Vegetable compounds were found in the stock of 137 bakers, while the other fats were found in a decreasing number of stocks down to 27 for vegetable oils.

Fillers

Fillers for pies and similar products were included in the stocks of 77 bakers. Corn starch was most commonly used. Tapioca flour was found in only two bakeries, while in four flour was used as the filler.

Flavors

Lemon, vanilla and orange were the predominating food flavors, although a half dozen others were found in a small number of cases. Vanilla, lemon and orange were found 138, 136 and 49 times respectively in the stocks of the 141 bakers who made use of food flavors. Almost without exception the vanilla flavor was either a compound or imitation since the true vanilla flavor has been proven unsuitable for use in both extreme heat and cold.

Fruit (Other Than Dried)

All of the 99 bakers baking products in which fruit forms a part had stocks of canned fruit. Twenty-four of these bakers used more or less fresh fruit.

Jellies and Jams

One hundred and eighteen stocks contained jams or jellies or both. Forty-eight of these stocks contained true fruit products, while 78 contained compounds or imitations.

Milk

One hundred and forty-four of the 150 bakers used milk in some form. Seventy-nine of the stocks surveyed included condensed milk, 59 fresh milk and 59 dried or powdered milk. In most cases these were skim milk, the butterfat having been partially or wholly removed.

Nuts

The most popular nuts were peanuts, walnuts, pecans and almonds, occurring respectively 79, 67, 54 and 41 times in the stocks of the 110 bakers

who use nuts in their products. Filberts were found in the stocks of three bakers and mixed nuts only in a single instance.

Marshmallow

Sixty-seven bakers used marshmallow fillings or icings in the case of one or more of their products. Forty-eight of these bakers used some form of commercial powder, while 19 prepared their own product from two or more of the following: egg white, sugar, marshmallow candy, starch, gelatine, corn syrup.

Icing

Of 137 bakers using some form of icing 27 employed a commercial powder, while 110 manufactured it from two or more of the following: milk, sugar, cocoa, glucose, fat, starch, gelatine. Glucose, starch and gelatine were very seldom used.

Cream Puff Filler

Seventy-seven bakers manufactured products in which some form of cream puff filler was used. Except in 18 cases the filler was of home manufacture. The products most commonly used in these fillers were eggs, milk, sugar and starch, although flour and some form of fat were sometimes used. The name for this product seems to be a misnomer since in not more than a half dozen cases was any butterfat used except the small amount that might be contained in the milk.

Pies and Pie Formulas

Considerable information was gathered from those bakers who baked pies, relative to the use of fillers in fruit pies and the composition of soft pies. With very few exceptions Indiana bakers were not using excessive amounts of starch or other filler in fruit pies, in fact but little more than that used by the housewife. In the case of soft pies the situation was not satisfactory. In many cases the soft pie contained little or none of the ingredient whose name it bore. Often the formulas for lemon pie provided for none of the fruit of the lemon but consisted of starch powder, flavored with oil of lemon, colored and acidified with citric acid. The formulas for custard pies were often deficient in egg and milk. Likewise cream pies were chiefly starch and sugar. No uniform practice seemed to prevail. Some of these pies were of high merit, while others were frauds and deceptions.

These summaries show some very interesting facts. As in the case of the home,

vegetable fats have come to be very widely used in the bakery. Milk has come into general use almost over night as an ingredient of bakery products, especially of bread, and the tendency is, as would be expected, to the use of the condensed or dried form. The baker has recognized the food value and the delicate flavor of nuts and is undoubtedly using them in increasing amounts, especially the pecan.

Color in Cakes

The fact that two-thirds of the bakers are using yellow color leads one to wonder if its popularity is due to the great demand of the consumer for yellow, or whether it is due to the fact that it is used to simulate the color of egg and thereby mislead the housewife as to the character of the cake or rolls which she purchases. When we note the dearth of yellow icing on cakes and other bakery products we are compelled to accept the latter view.

Judging from the composition as indicated above, the term "cream puff filler", "icing" and "marshmallow" seem to have no definite meaning. All these products are prepared from a rather large range of ingredients, and in many cases the terms seem to be applied to similar products indiscriminately.

Jellies and Jams

It is disappointing to note that in the case of jams and jellies the imitation or compound predominates over the true fruit product. It was determined during the survey that many of the imitations and compounds were bought at prices ranging from four to eleven cents per pound which would seem to indicate that they contain but little true fruit or sugar. The question immediately arises whether tarts, jelly rolls and similar products prepared from these articles can be sold under the name of a fruit without violating state and national laws. The fact that

48 bakers out of 118 using jams and jellies used the true fruit product clearly disproves the statement that they cannot be used because they produce sticky, soggy bakery products which are unsalable. It was also noted that jelly rolls baked by two bakers in the same square in the same town, one using true fruit and the other an imitation, sold for the same price.

Except for certain trade practices which have been indicated, the results of the survey of bakers' stocks are very satisfactory. With scarcely an exception the raw materials of whatever nature were of good quality, wholesome in every respect and fit to be manufactured into first class bakery products. Not a single lot of any raw material was condemned as unfit for use.

The information obtained proves beyond doubt, at least in Indiana, that bakers' store rooms are not, as has sometimes been alleged, made the dumping ground for spoiled and doubtful canned goods, wormy and decayed nuts and unedible dried fruits.

Bakery Sanitation

The results of the survey from the standpoint of sanitation of the bakeries and the handling of bakery products were not so satisfactory. Of the 150 bakeries inspected one was rated excellent, 74 good, 67 fair, 6 poor and 2 bad. In making these ratings the inspector considered the cleanliness of floors, walls, ceilings, shelves, counters, back rooms and cellars; the provisions for dressing rooms, toilets and wash basins; the light and ventilation; the appearance of employees; the condition of delivery equipment; the general sanitary condition of the premises; the employees health certificates and the character of the water supply. It is expected that occasionally a poor or bad bakery, judged from a sanitary stand-

point, will be found, but the ratio of fair bakeries to good bakeries should be much less than 67 to 74. A further analysis of the inspection reports in the case of the 67 bakeries rated as fair, indicate that with two or three exceptions all of them were deficient in one or more of the points above enumerated. Floors, shelves, ceilings, back rooms and cellars were dirty, walls and ceiling dingy, light and ventilation poor, employees slovenly in dress; no dressing rooms, toilets or wash basins; premises untidy and delivery equipment dirty and unattractive. All of these objections could be easily removed by a wide-awake baker, thus raising the rating of his bakery. This type of bakery is usually operated by a baker who is not yet awakened to the new order of things in his industry. In many cases he is still using the cheapest ingredients, sometimes practicing fraud through the use of color or other means to make his products appear better than they really are and giving no thought to their nutritive value, a matter to which progressive bakers are now giving so much attention. Products of this character offered to the consumer in a dingy, unattractive sales room will bring failure in the end. Such a baker can save his business only through his own initiative and ability to cultivate a "sanitary sense" that will enable him not only to manufacture clean products but to offer them under conditions that will attract customers.

What Will the Future Be?

As to what the future holds for the baking industry and especially for the numerous small bakers that compose a large part of the industry one can only prophesy. Judging from the tremendous progress, not of the last decade, but of the last year or two, the prospects are very bright if only the industry makes use of its opportunity. Reorganizations

and consolidations involving immense capital have taken place in the industry only very recently, but the fact remains that the great bulk of bakery products will still be manufactured and sold by the comparatively small baker who will prosper to the same degree that he meets the demand of his particular consuming public. The "ideal loaf" about which we have heard a great deal will differ in some respects for each community, yet it will always be manufactured in a sanitary bakery of good, sound, wholesome materials of the highest nutritive value. There is no reason why water should not be almost wholly replaced by milk as the liquid ingredient of bread dough, and judging from information gained in the recent survey, this will come about in the near future. Bread may be rightfully classed as one of the two universal health foods. No one desires to make it a complete food, but in view of the fact that it is universally consumed and, in the case of children especially, forms a very large part of the diet it should be made with the highest nutritive value possible. Through the use of milk the consumer obtains all the nutritive value of the milk as well as that of the other ingredients and at the same time, which is tremendously important, an outlet is furnished the farmer for surplus milk and skim milk.

In the future the successful baker will not use yellow colors to simulate the appearance of egg in cakes, pies and rolls, thus deceiving and defrauding his customer. Colors have their legitimate place in the food industry but only to make foods more attractive and thus more desirable without detracting from their value. In the baking industry their use can be for ornamental purposes only.

It is safe to predict that the situation as it relates to the soft pie industry will greatly change. "Cream," "lemon" and

other terms with very specific meanings will indicate definite products of recognized value rather than conglomerate concoctions which are now so widely sold under these alluring names. Cream pie will contain dairy products, and lemon pie will contain fruit of the lemon. Worthless fillers and synthetic flavors will be eliminated.

The prosperous retail baker of the future will make the most of his able allies, soap, water, paint, display cases and trained saleswomen. He will give as much attention to the appearance of his shop, especially the salesroom, as he does to the quality of his raw materials and the manufacture and handling of his finished products. He will see to it that his products do not deceive either through appearance or the label and that the consumer receives what he desires in the way of taste, flavor and attractiveness in his bread, cakes and pastries.

I know of no better rule by which the baker can conduct his business than that included in the code of ethics of one of our great National Food Associations—"I pledge myself to be an exponent of the three great virtues: Truth, Honesty, Service. I shall strive at all times to apply these great virtues to my own business, thereby truthfully and honestly serving human society."

The Housewife Emancipated

THE old-fashion prejudice against anything but home cooking has largely evaporated. The same prejudice existed once against bakery bread. Yet now the use of bakery bread is practically universal. And undoubtedly it gives a higher percentage of wholesome loaves than the often inexpert, haphazard home baking of former times.

By specialization we should eventually have better, more digestible and health-

ful foods, prepared by experts, than even "mother used to make."

A few decades hence it will seem no more necessary for individuals to do all their cooking than for them to make their own clothes or shoes or build their houses.

In the old days the housewife baked bread, washed, made clothes and hats, took care of the children and cleaned house. Her time and thoughts were completely taken up from morning until night.

Modern home conveniences, the universal use of bakery bread, laundry service, milliners, nurses and maids have relieved her of much of the drudgery of routine.

Her leisure time has steadily increased. The result has been the New Woman.

—Dr. Frank Crane,
The McClure Newspaper Syndicate.

South Dakota supplies considerable bread wheat to the nation and we are therefore interested in your business. When I first came to South Dakota practically all bread used in the state was baked in the household oven. Today probably more than 50% comes from commercial bakeries and this is largely due to the excellent product put out by members of your association.

—B. F. Myers,
South Dakota Dept. of Agr.

I am not quite sure whether the volume of quackery in food advertising is actually pyramiding, or whether it is merely true of the volume which is coming to our attention. If the former is true it seems to me that it will be necessary in the near future for all the elements in the food industry who stand for the straightforward exploitation of honest products to join hands in a campaign of defense.

—Holland Hudson,
Natl. Better Business Bureau, Inc.

Less Refined Bread Not Helpful

Men Who Work Hardest Prefer White Bread Because of Its Greater Nutritive Value

By THOMAS BARLOW WOOD, F. R. S.

THE NINETEENTH CENTURY AND AFTER, a British literary magazine, in its August number prints an article on "Bread" by Dr. Thos. B. Wood, Drapers professor of Agriculture, University of Cambridge. The Story of a Loaf of Bread, published by Dr. Wood in 1923, his outstanding services on the English Food Supply Committees during the war, his book on Animal Nutrition printed in 1924 and his many contributions to the sciences of nutrition and agriculture establish beyond question the place Dr. Wood occupies as a leader in his field. We print the following abstract of his article on "Bread" with much pleasure, knowing that it will be of real interest both to the milling and baking industries and to students of nutrition.

Bread is by far the most important item in the national bill of fare. It supplies rather more than one-fourth, or if flour is included, one-third, of what may be called the motive power of the nation. The importance of a good and cheap supply of bread for the population is so great that it looms large in politics, especially at election times. It has recently occupied much of the time of a Departmental Committee and a Royal Commission, and is now under examination by a body of scientific experts. A subject of such national interest and importance has naturally suffered from much wild writing and wilder talk, and the time is perhaps ripe for a plain statement of some of the more important facts.

Bread is made from flour. Flour in turn is prepared from wheat by the process of milling, and converted into bread

by the process of baking. Since most of the points under discussion have arisen from modern changes in milling and baking, a short survey of these changes will help to define the situation.

Before the year 1870 or thereabouts, home-grown wheat formed the basis of the nation's bread supply. This was milled by grinding between millstones. The bran was sifted out from the flour, and nobody worried about the color or texture of the bread. If the harvest was bad, the bread was bad; if the harvest was good, the bread was better. Such as it was, it was accepted because there was no alternative.

Before 1870 the national bread supply was made from home-grown wheat ground in country mills between millstones. Since 1890 the wheat supply has been largely imported, and is ground in roller mills situated for the most part near the larger seaports where the wheat is landed.

This revolution in milling was naturally accompanied by a change in the character of the bread it produced. Bread before 1870 was not white, since millstones could not grind the inside parts of the grain without grinding also the husk. Sifting, therefore, only removed the coarser particles of husk or bran. The finer particles were left in the flour, and they naturally discolored the bread. But perhaps the most unpopular characteristic of such bread was its great variation with harvesting conditions, and this was accentuated by varying treatment in the household, for much bread before 1870 was home-made. Contrasting sharply with the dark color and varying char-

acter of bread before 1870, bread made from roller-milled flour is white, because rollers separate the flour without much tearing of the husk, and very uniform in character, because the modern miller adjusts his blend of foreign and home-grown wheats so as to ensure uniformity in his product. It was this whiteness and uniformity of product which captured the public taste and made the practice of roller milling general.

From time to time since the use of bread made from roller-milled flour became general there have arisen enthusiastic bands of so-called food reformers who have attempted to set back the clock by persuading, or even compelling, the population to eat wholemeal bread, or standard bread, or some other kind of bread resembling the old home-made bread of the stone-milling days of fifty years ago. Every new idea of nutritional physiology has formed the basis of a new bread reform campaign. So far there has been no widespread return to stone-ground flour. It was estimated by a well-known authority that at the height of the standard bread campaign which followed the discovery of vitamins the consumption of standard bread did not reach 7 per cent. of the total consumption. In spite of this, the subject is worth serious consideration. Is it true that modern white bread is a worse food than bread made from stone-ground flour?

Bread protein is fairly well digested, and, like other proteins, can be used in the body to repair the waste of the working tissues in the adult, and in addition to build up new tissues in the young and growing subject. Unfortunately, however, it is not a particularly good protein for this purpose. Proteins are very complicated substances, each containing about twenty separate constituents, which are the same in all proteins, but vary widely in the proportions in which they are

present. The mixture of proteins known as bread protein differs widely in composition from the proteins which form the basis of the working tissues of the human body. It contains too much of some constituents and not enough of others. Consequently when the human body utilizes it for tissue repair much of the too abundant constituents is left over and goes to waste. When its constituents, after being separated in the process of digestion, are re-assembled to make human tissue proteins, a pound of what was bread protein makes little more than half a pound of human tissue protein. This is obviously a wasteful method of maintaining the human body in repair. Consequently the conclusion appears inevitable that, instead of changing the methods of milling and baking in order to get more wheat protein into bread it would be wiser to take bread as it is and to supplement it by including in the diet a fair proportion of other articles of food whose protein contain little of the constituents which are abundant in bread protein, and are rich in the constituents in which bread protein is deficient. Such articles are milk, meat, and vegetables. By including them in the diet not only is the protein intake increased, but there is also an improvement in the utilisation of that part of the protein which is eaten in the form of bread.

Besides its value for tissue repair, protein is also used in the body as a source of muscular energy, being for this purpose of the same value as carbohydrates.

Fat and ash exist in bread in very small proportions, only just over 1 per cent. Fat is valuable as a source of muscular energy, weight for weight about two and a quarter times as valuable as carbohydrates or protein. The quantity of fat in bread is, however, so small that its effect is for practical purposes swamped in the very much larger amount of fat commonly eaten with bread in the form

of butter or margarine. The ash, or rather one constituent of it, namely, the phosphoric acid, although small in amount, is one of the points on which food reformers usually lay great stress. White bread is quoted as being deficient in phosphoric acid as compared with less refined bread containing a greater proportion of the parts of the grain which lie near the husk. This is undoubtedly true, but not so important as it appears at first sight. Phosphorus is, of course, an important ash constituent, but from recent work it appears that a proper balance of the various ash constituents is at least as important as the quantity of any one of them. It is true that the ash of the parts of the grain immediately in contact with the husk is rich in phosphoric acid, but at the same time it is deficient in lime and very badly balanced in this respect.

From the point of view of ash constituents therefore it would be better practice to supplement bread with some article or articles of food supplying a well-balanced ash rich in lime than to increase the ash consumption by retaining in the bread the ill-balanced ash associated with the outer layers of the grain. Milk and vegetables can be recommended for this purpose. Traditionally milk goes with bread, and tradition is confirmed by protein research, which has shown that its proteins are, so to speak, complimentary to bread proteins, and its ash to the ash of bread.

The very small proportion of fibre in ordinary bread represents the indigestible material of the flour, derived for the most part from unavoidable inclusion of husk. It is a very variable constituent. Bread made from "patent" flour contains only a trace; bread made from wholemeal flour may contain over 1 per cent. Fibre contributes little to the nutritive value of bread, but if much is present, and that not finely ground, as is often the case in

what are known as brown breads, the coarse, indigestible particles sometimes irritate the walls of the intestines, giving rise to disagreeably frequent excretion. In other cases the same bread may be usefully laxative, and it is wisely eaten by many people for this reason.

Bread made from high-grade "patents" flour is found to contain 1273 Calories per pound as compared with 1106 Calories per pound in bread made from low-grade flour. But these figures still do not accurately express the relative nutritive values of the two kinds of bread. They give the Calories contained in the bread, which is not quite the same thing as the Calories which the human digestive system can extract from it. Several series of determinations of the digestibility of various kinds of bread are on record. The most authoritative series was that carried out by the Food Committee of the Royal Society during the latter stages of the war, but the conclusions of that series are not applicable to the present discussion, for all the breads under experiment were made from flours constituting 80 per cent. or more of the wheat from which they were milled. From similar investigations carried out in Cambridge before the war it appears that 96 per cent. of the Calories contained in bread made from "patents" flour are digestible as compared with only 90 per cent. in the case of bread made from stone-ground flour from which only about 12 per cent. of bran had been sifted. Applying these factors to the gross Calorie values of the two breads worked out above, it appears that bread made from "patents" flour yields to the human body 1222 Calories per pound, whilst the less digestible bread made from low-grade flour yields per pound only 995 Calories. These figures, since they apply accurately only to the actual samples tested, may well be rounded off, and good-class white bread, containing about 35 per cent. of

water, may be credited with 1200 available Calories per pound, as against 1000 Calories per pound in the darker, moister bread, containing about 40 per cent. of water, which is baked from flour from which only the coarser parts of the husk have been sifted in milling.

A man who is engaged in strenuous labor requires something like 4000 Calories per day. He takes about half of these Calories in the form of bread. To provide 2000 Calories he must eat 2 lbs. of dark, moist bread or 1 2/3 lbs. of white bread. His appetite may enable him to eat this smaller quantity with relish, whilst the larger quantity would exceed his normal appetite, and if he succeeded in eating it would cause considerable discomfort. It is notable that the strongest preference for white bread exists in the industrial districts, where men work hardest.

It may be urged, as has been contended above, that they should replace part of their bread by some other article of food which yields more Calories in less bulk. This is the course followed by the well-to-do, to whom the price of their food is not of extreme moment. But the working man cannot follow this line, for bread provides him with his Calories at a far cheaper rate than he can buy Calories in any other abundant and commonly used foodstuff.

Bread must, therefore, supply a very large proportion of the workman's Calories. It is very filling stuff, and he naturally chooses that variety which gives him most Calories in least bulk. He supplements it with as much milk, meat, and vegetables as his pocket allows. These articles correct the deficiencies of the protein and ash of the white bread he eats, and supply the necessary vitamins. It is more than doubtful if the less refined bread so often advocated would make an improvement in his dietary.

A Real Partnership

"White bread, it is stated, has suffered not only at the hands of physicians who have failed to appreciate the increased nutritive value of the modern loaf, but the dental profession has been equally careless in criticising it."

"No baker will take any exception to the purpose of physicians and dentists to build a stronger, finer race. He will contribute his loaf made with milk to that end and he will hope that in the development of all educational campaigns the argument used and evidence presented in support of any contention that the dietary should be changed will be founded on fact. Any campaign which does not take cognizance of the latest discoveries in the field of nutrition will fail in its purpose.

The way now seems clear to set up a partnership with these tremendously important groups which will within the next few years completely change the attitude of the consumer toward the baking industry. And we believe our friends of the dental and medical professions will soon recognize the fact that the work of American Institute of Baking and the interests of the entire baking industry in the manufacture of better bread is helping them in their educational work on nutrition. If you do not think personally that there is need for work on your part in defending your loaf of bread with the medical profession, osteopaths and dietitians, glance for yourself at one of their diet lists and note their recommendation to their patients on the use of white bread. We believe most of this is caused by their misunderstanding of the true nutritive value of a loaf of white bread made with milk, as manufactured in the bakery plants of today.

—Lewis F. Bolser.

Digestibility versus Roughage and Vitamins*

By WALTER C. ALVAREZ,

Hooper Foundation for Medical Research

DURING the last ten years enormous strides have been made in our knowledge of nutrition and dietetics. Most spectacular have been the discoveries in regard to vitamins: those little things which are so essential to the development and health of the individual. These discoveries have impressed themselves so strongly upon our imaginations that many of us seem quite to have lost sight of one of the most important factors in a diet and that is its digestibility. Today we often get so interested in supplying vitamins and bulk and iron that we pay no attention to the fact that we are asking invalids to eat some very indigestible things.

Matters have come to such a pass that it is really difficult now to secure proper food for sick patients in hospitals. The dietitian in charge is generally so impressed with the importance of vitamins and bulk: salads, rough vegetables, fruits and spinach, that no matter how often I ask that these foods be left out, they soon reappear on the patient's tray.

These dietitians who follow Dr. McCollum so enthusiastically—perhaps the best known authority in the world today—have failed to note the warning given in his book against the danger of approaching this subject with a Polyphemus eye. As you will remember, Polyphemus was a giant with only one eye in the middle of his forehead. You see then that I am backed by good authority when I beg of you not to prescribe diets with only one

factor in view. There are many factors which enter into the prescription of a diet, and we must try to keep them all in mind. Furthermore, we must keep in mind the needs and deficiencies of the particular patient before us. As everyone knows, a diet for a healthy man may not agree at all with one who is sick.

It is an interesting fact that Hippocrates, the Father of Medicine, who wrote some 450 years before Christ was born, believed that the Science of Medicine had had its beginnings in the efforts of men and women to find better and smoother diets. He tells us that in the beginning, primitive peoples probably had to live upon rough grains and raw foods much as the herbivorous animals do. But these things were hard to digest and those children who were weak and sickly probably succumbed on account of the coarseness of the diet. Gradually better foods were developed, whiter bread was made, and man learned to cook his foods and to prepare special dainties for the sick.

The surprising thing today is that many of us are trying to throw overboard all this knowledge which has been gained so patiently through the ages. We give our little children rough vegetables and raw fruits which our grandmothers put aside as indigestible and colicky. The patient who has just recovered from a serious abdominal operation is given salads and vegetables, fruits and spinach,—all difficult of digestion. A strong effort is being made also in many quarters to get rid of our white bread, and to revert to the

* An address before the American Home Economics Association, 18th Annual Meeting, San Francisco and Berkeley, California, August, 1925.

coarser and more indigestible breads of our ancestors.

Why do we give bran? Simply because it is one of the most indigestible substances which the Lord has made. He made it thus so that seeds coated with it would go through the digestive tracts of herbivorous animals and out again still intact and fit for germination. Then we take this absolutely indigestible woody substance and prescribe it for invalids! Last year I saw a woman who had been perfectly well until some four months before she came to me. She then visited a sister who had been cured of constipation by eating bran mush. My patient tried it and liked it so well that she was soon eating heartily of it. Very promptly she developed such flatulence, abdominal pain and indigestion that she had to begin cutting out one food after the other in an attempt to find the offending one. In order to make up for the loss of these foods she ate more bran. Her weight rapidly fell off and when I saw her she was but skin and bones. I said: "Why did you not stop the bran?" She answered—"I never thought of that because it said on the package that it was a health food." As soon as we stopped the bran her symptoms disappeared.

The lesson from this is that some men and women can be greatly helped by bran, and their constipation can be cured if they happen to have the digestion of an ostrich; but if they happen to have congenitally defective or handicapped digestive tracts; if they have ulcers or narrow places, they cannot handle the mass of indigestible material, and they promptly get into trouble.

Why can a goat eat the paper off a tin can? Simply because he has a long specially designed digestive tract in which he can keep that paper for two weeks. During that time the bacteria in the bowel can break it down into sugars which are

then digested. Neither that goat nor man has any ferment like pepsin to digest the cellulose or paper-like substance which makes up the fibre of vegetables and fruits.

A giraffe who lives on rough tree tops has an intestine 100 times his body length. A cow has an intestine 27 times its body length, while a cat has a bowel some 3 times its body length. Man's bowel is only about 7 times his body length so it seems pretty clear that the good Lord intended him to be more carnivorous than herbivorous in his dietary habits. If he had intended us to live largely on vegetables it would seem that He should have given us either the large intestinal pouches of a horse or a rabbit, or the many-chambered stomach of a cow or a sheep.

Many people think that man originally was a fruitarian or a vegetarian, but any student of savage races or of ancient man knows that he was a hunter and a fisherman for thousands of years; later he became a herdsman, and only as he became semi-civilized did he cultivate the soil and learn to eat grains and garden vegetables.

We must remember also that some people have intestines which are only half as long as those of the average man. These people are therefore even more decidedly carnivorous in their body structure, and they cannot help but be greatly handicapped in their efforts to eat vegetables.

There is still another thing which we must remember when we are prescribing rough foods and that is that the digestive tract must be in good working order if it is to pass them onward without distress to the individual. The normal digestive tube may be likened to a pipe line which has such a good drop that anything and everything will run through it without delay. A sick man's digestive tract is

more like a pipe that has stretches where it runs up hill. Liquids can be forced through such stretches, but solids will go through only with the greatest difficulty. A man with a tube like that does not necessarily have to be fed liquids, but he will be greatly helped if he is given those foods which soon become liquid in the stomach and upper bowel.

Hence it is that when we are dealing with born dyspeptics with their congenitally inferior digestive tracts; when we have patients with ulcers and narrow places in their intestines; when we are dealing with men and women who have just been operated upon and who have irritable suture lines in their abdomens, and when we are dealing with men and women whose digestive tracts are being thrown into spasms by inflamed gall bladders or appendices we should go back to the smooth diets of our wise old grandmothers. We may even for a while forget about vitamins and roughage and iron and calcium, because the patient is going to be in the hospital for only two or three weeks and we do not have to worry at all if he should miss some of his dietary factors during that time. He has enough stored in his body to tide him over a much longer period even than that.

We must remember also that there is little need for worrying at any time about the vitamins in the diet of an average middle class American. He will probably get all that he needs even on a smooth diet; and so far as I know, there is as yet no evidence that a superfluity of vitamins makes a man any more healthy than he is when he has just enough for his needs. It may be that they are like other foods and that enough is better for us than a feast. A little knowledge is not always a dangerous thing, but for a conscientious mother it is often a troublesome thing. It makes her stuff her children with a lot of spinach and greens and

fruit in an effort to give them more vitamins than they can possibly use. It is doubtless a good thing to train children with good digestions to eat everything that comes to the table, and it may be that the chewing of some of these rougher foods will help the development of their teeth and jaws, but I cannot help feeling that much of our present craze for rough foods is a fad—something which we have taken up eagerly, but without sufficient thought and study.

Please do not misunderstand me now and go away saying that Dr. Alvarez is absolutely set against rough diets and uses only smooth ones. If I did that I would be doing just what I have been decrying in some of my confreres. I often prescribe rough diets for those who want to be reduced, for the diabetic or for the constipated, but I always ask first if the individual has ever had trouble with such foods in the past, and I warn him to consult me again if he should develop flatulence and indigestion on the new diet.

The message that I leave with you is that we must not ride our hobbies too hard and we must never try to treat our patients all in the same way.

Please Pass the Pie

"My lifelong championship of pie as America's greatest contribution to human happiness has been triumphantly vindicated by the experiments of Chicago nutrition experts. Two groups of rats were used in the tests; one group was fed on pie, and the other on the 'good, wholesome foods' — rice, potatoes, cabbage, spinach, bread. And the pie-fed rats gained more rapidly in weight, health, muscle and good spirits than the others. I predict even better results from an experiment with human beings instead of rats."

—Ted Robinson,
In Cleveland Plain Dealer.

Up From The Soil

The Story of Wheat from the Field to the Table as Told in a Volume from The Manhattan Library of the Bank of the Manhattan Company

When black years of adversity brought wheat farmers everywhere to the edge of financial ruin they called on the Government for help not realizing that undesirable economic conditions can never be remedied by legislation. But while seeking panaceas in Washington they were working out their own salvation through the development of diversified production. The story of the lean years and changing conditions follows in this third installment of *Up From The Soil*.

Chapter Five

FOUR BLACK YEARS

THE history of American wheat-growing has not been a series of high and uniform triumphs. Like most things human it contains an abundant record of mistakes and misfortunes, some of which, like the "four years of black depression" ending in 1924, have involved widespread disaster. But all these experiences are deeply educational: they point great lessons by means of which future mistakes may be avoided.

The farm is no longer the "self-contained unit" of former years. In an earlier generation, nearly all the necessities of living were produced on the farm, but specialization has changed this. The farmer now produces and exchanges just as does the weaver or the oil refiner. He has become one of the cogs in a vast economic mechanism. His welfare is dependent on that of millions of other cogs and their welfare is dependent on his.

The farmer's place in the whole industrial system bulks very large and is of exceptional importance. The United States has one business concern to every two hundred and seventy-five acres of improved land, and an increased or de-

creased income from these acres affects the entire business of the country.

When, in 1914, the guns began to thunder on European battlefields, the wheat culture of the American northwest had reached what was considered a level of considerable prosperity. Climbing steadily from the low level of half-dollar wheat which followed the business depression of 1893, it had seen a virtual doubling in the price per bushel and in the amount produced. The war brought an immediate stimulation to both. The year 1915 witnessed the unprecedented production of more than a billion bushels, which sold readily at high prices. Wheat growers reaped a harvest of gold. With large areas of Europe withdrawn from cultivation, the demand and the prices continued to increase.

Then America entered the war and the Government called upon the farmers for more and more production. "Win the war with wheat" became a slogan. The promised reward lured barbers, bricklayers, paper-hangers and other city workers, inexperienced in agriculture, to the fields. Wheat farmers mortgaged their lands to buy additional acres. New banks were established and credit was abundant. Former lessons were forgotten. A wild,

speculative spirit swept the northwest and multitudes forgot precautions in the joyous occupation of "getting rich quick."

Meanwhile, the price of wheat continued to advance even after the armistice and finally reached the dazzling figure of \$2.73 per bushel. The nation was drunk with prosperity and the silk shirt became the common garment for the farm and factory worker. The fact that the war was over seemed to be forgotten. Then there came the inevitable reaction—the plain lesson of all economic history. "The cold gray dawn of the morning after"—otherwise the year 1920—found the world with more wheat than it needed and European nations with exhausted credits. Buying slowed up with abruptness; prices dropped like a plummet—to \$1.25 a bushel in sixty days. Incidentally, it demonstrated that farming, like every other industry, is subject to the operation of the old, familiar, economic law, that neither longing nor legislation can lure reluctant dollars from a glutted market.

This experience brought tragedy to the northwest. Mortgage indebtedness due to the era of expansion had increased, from \$169,000,000 to \$539,000,000 in four states, and interest requirements were enormous. Taxes had grown high. Failures became epidemic. In fifteen States, eight and one-half per cent. of the owner farmers lost their property between July, 1920, and March, 1923; another fourteen and one-half per cent. were insolvent. Some six hundred rural banks failed and 1,120,000 people left the farms for city work.

A significant fact was found, however: it was that, in the section where failures were most numerous, over half of those who had been lured to the land had had no previous farming experience and a third of them had come without any capital.

Naturally, this reaction entailed severe

misfortune to local dealers who had been selling to the farmers everything they needed and a lot they didn't need—on the customary promise to pay "when they got threshed." It also brought stringency to manufacturers, wholesalers and the entire business community.

Bad as it was, this disaster would have been much worse had it not been for the prompt rallying to the aid of the farmer of large banking, railroad and manufacturing organizations. The thousands of acres in Western Kansas, which were seeded through a fund advanced by millers and manufacturers to help farmers to put in a crop, furnish a striking illustration of interdependence.

The farmer is rapidly coming to understand the significance of this economic interdependence. We have developed an intricate, highly-specialized industrial system, in which each of us does some one thing that often seems to have little direct relation to his own wants, but through which he satisfies his wants by exchanging products and services with others; although he may not see the full working of it, properly estimate his own part in it, or fully appreciate the benefits that it brings to him.

Chapter Six

FROM ADVERSITY TO DIVERSITY

WITH blind faith many people look upon the Government as a mysterious, magic worker, capable of overturning undesirable conditions by the mere enactment of a law.

The futility of such belief was strikingly demonstrated in 1924, when the agricultural "bloc" in Congress tried to secure the passage of one law to increase the price of wheat and of another to reduce the rates at which the railroads should be required to carry the wheat

crop of America. The motive was the proper one of desiring to relieve the financial distress of the farmer, even though he had chosen to plant wheat in excess of the normal consumption, rather than to adjust his crops to the needs of the market.

The efforts failed; the laws were not enacted; prophets of gloom, in and out of Congress, predicted wholesale ruin in the wheat belt; and then, remarkable to relate, the price of wheat shot upward by seventy per cent. and the wheat belt saw the dawn of prosperity. What had happened? Merely that a shortage had developed in the wheat crops of Canada and Australia and the world was forced to turn to the producer of the United States. It was simply an application of the Law of Supply and Demand.

The farmer is in business to make money, just as are all of us. Quite naturally and properly he desires to increase his profits. When he thinks that such increase must come only from an advance in the selling price, regardless of the Law of Supply and Demand, he is courting disappointment, if not disaster. When he realizes that profits may be increased by reducing production costs, rather than by raising prices by law, he is apt to be on the road to sound prosperity.

The North Dakota Department of Agriculture made a survey of the cost of producing wheat in that State, with this significant result: It was found to range all the way from eighty cents to seven dollars a bushel. It was discovered that at a selling price on the farm of even \$2.50 a bushel, sixteen per cent. of the farmers would still be losing money because it would have cost them more than that to produce the wheat.

Imagine the absurdity of ignoring the inexorable economic law under such conditions! Imagine the futility of seeking to escape, through political means, the

obvious fact that a farmer who produces at eighty cents per bushel can prosper on a market that would bring swift bankruptcy to the seven dollar and a half man! The difference lies in method.

Fortunately, at the present day there is appearing much new and valuable aid for the farmer. The Department of Agriculture, colleges and experiment stations, supported by the Nation and States, bankers, railroads and machinery manufacturers, are delving into and solving the problems of science and common sense in farming, and making the facts easily available to all. The County Agent, the representative of Uncle Sam's storehouse of agricultural knowledge, is everywhere. The farm bulletin, journal and newspaper transmit useful information to every corner of the land.

Such helpful organizations as the American Farm Bureau Federation, the Agricultural Commission of the American Bankers' Association, the National Association of Farm Equipment Manufacturers and the Millers' National Federation are studying the farmer's problems and giving him the benefit of their knowledge and counsel. They are seeking to impart an appreciation of the value of effective organization in agriculture as exemplified in other business. The farmer is warned against waste, for the first need of good farming, as of any other industry, is to do away with unprofitable production and unnecessary expenses.

Supplementing these is the operation of the farmer's co-operative business organizations, of which the purpose is not to defy the economic law but to work with it. In this co-operative movement about one-sixth of the farmers are engaged, and through it more than one-tenth of all the crops, measured in value, are marketed. Collectively, farmers are learning that their ability to merchandise their crops systematically is just as great as that of

any other industrial group. By these and other means, the wheat grower is learning to avoid pitfalls and to increase his margin of income over outgo.

At the same time he is giving earnest thought to another great problem, that of greater security against sudden disaster. Out of the harrowing experience of the years 1920-1924, has arisen a realization of the value of diversified production. The lure of wheat had blinded many to the fact that a farm must be first a home and then a business, hence, that the farmer's primary duty is that of producing the family food and other necessities that can be raised more economically than they can be bought.

The farm is the nation's food factory, and yet one of its largest items of expenditure is for purchased food that the farm itself might have produced. Here is an economic waste that can be corrected by diversified farming.

Great as are the rewards of properly balanced, interdependent industry, the old independence enjoyed by the farmers of a century ago is still a valuable asset. The farmer who maintained this independence through the recent years of depression was not among the 1,200,000 who had to abandon their farms to seek bread in the city factory. Ten years ago only an exceptional wheat farmer kept more than a cow or two. Today, many farmers in the great Wheat Belt are paying their way out of adversity with milk checks deposited with the local bankers who loaned them money with which to buy dairy cows.

(To be continued)

As An Editor Sees It

"Apparently those who advocate Whole Grain Wheat as a food have been responsible for much of the controversy concerning the demerits of other kinds of

food, and in particular, white bread. Those most interested in furthering the consumption of whole wheat bread and whole wheat as a breakfast food are those who have these products for sale, and at the present time the rankest kind of commercialism is rampant in an effort to promote sales. The advertising is misleading and much of it is absolutely untrue, and when an advertiser blatantly circularizes any community with the announcement that Whole Grain Wheat is used for the correction (it is a wonder they do not say "cure") of diabetes, asthma, high blood pressure, catarrh, nervousness, piles and several other disorders, it seems to us that it is high time that the associations of advertisers and better business bureaus who frown upon deceptive and misleading advertising should place their stamp of disapproval upon such a policy. The circulars distributed and prominently displayed to the laity contain testimonials which would do credit to the most objectionable supporters of nostrums and quackery, and the reader is given the impression that if he or she desires to keep well or be cured of any diseases or abnormality to which flesh may be heir, all that is necessary is to eat Whole Grain Wheat. Even cancer is not omitted from the list of affections considered in the question of making Whole Grain Wheat a part of the regular diet, and the exploiters have missed a good bet if they have not worked the tuberculosis game along with the rest for, be it known that those who have or suspect that they have tuberculosis are the most susceptible dupes in the world. We think it is high time for Hygeia and some other trustworthy modes of spreading information to acquaint the people with the dangers of such misleading advertising that is purely in the interest of unfair gain."

—Jour. Ind. State Med. Assn.

Causes of Fires in Bakeries

*How Good Housekeeping Will Prevent Costly Fire Losses
and Reduce Insurance Rates*

EVERY fire, no matter how small or remote, depletes the capital which makes industries possible. The fire loss of a baker in Maine is an indirect tax on the business of the baker in Florida and in Utah.

For fire insurance rates are determined by fire losses and the baker who protects his plant from fire and his invested capital by insurance has to bear the burdens which carelessness throughout the baking industry reflects back to him in the form of increased insurance rates.

That this carelessness is a heavy burden may not be obvious to the baker who has safeguarded his buildings by proper construction and eternal vigilance but when

one insurance company records a total of one hundred and forty fires in bakeries in a five year period a study of the causes for those fires justifies the conclusion that the baking industry as a whole has a very real concern in checking up its fire losses and in devising means for reducing them.

Reciprocal Exchange carries large amounts of insurance for the baking industry. It is familiar with its fire hazards and it has been helpful in pointing out means by which they may be eliminated.

At the request of American Institute of Baking it has furnished us with an analysis of the causes of bakery fires for the five year period ending December 31, 1924, in plants insured through Reciprocal Exchange.

Causes of Bakery Fires 1920-1924 Inclusive.						
	1920	1921	1922	1923	1924	Total
UNKNOWN	4	1	4	2	2	13
DOUGHNUT OR GREASE KETTLES.....	5	3	1	2	4	15
OVEN TROUBLE:						
Overheated or faulty ovens or oven flues.....	2	2		2	2	8
Heat igniting adjacent or overhead woodwork or flooring	1	1	4	2		8
Sparks from oven doors left open.....	2		1			3
Leakage of fuel oil to oven burners.....		1				1
Heat from oven chimney igniting adjacent material			2	2		4
Spontaneous combustion oily rags over oven..				1		1
BOILER OR FURNACE TROUBLE:						
Overheated smoke stack or stove pipe or register	1		1	2	2	6
Sparks from smoke stack or chimney.....	1	1	1			3
Overheated boiler or furnace.....	2		3	1		6
Hot ashes or embers against woodwork or in rubbish	2			1		3
Fuel too close to boiler.....		1				1
Defective flue or oil burner.....	1		1	2	1	5
EXPOSURES	2	1	2	3	2	10
ELECTRICAL:						
Defective wiring		2	3	3	1	9
Defective motor			1	2		3

MISCELLANEOUS:	1920	1921	1922	1923	1924	Total
Carelessness with matches, cigarettes or pipes..	5	1	5	2	3	16
Trespassers	1				1	2
Auto back fire and gasoline.....	2				2	4
Spontaneous combustion and rubbish.....	2			2		4
Fire cracker		1				1
Lightning		3	2		2	7
Workmen with torches or welding machine....		1	1			2
Waffle stand			1	1		2
Sparks from locomotive.....			1			1
Grease ignition (not kettles).....					1	1
	32	21	36	28	23	140

An analysis of these figures does not give one the idea that the baker is careful to avoid fires for most of the causes recorded were obviously the result of carelessness or indifference. Sixteen fires were attributed to carelessness with matches, cigarettes or pipes, fifteen started at doughnut or grease kettles, twelve from overheated woodwork or material adjacent to oven chimneys. Seventy-nine of the fires might have been prevented by care in operation or construction and a thorough inspection of wiring or flues and burners would have eliminated the causes of seventeen other fires.

It is obvious that "good housekeeping" is the first requisite for fire protection. And it is equally obvious, as Reciprocal Exchange points out in its report, that "carefulness would mean a marked reduction in number of fires and extent of damage, which would eventually result in more favorable insurance rates."

It is a criminal act to throw lighted cigarettes along the highway or to start a camp fire without a permit in our National Forests. For they are a part of our capital as a nation and are preserved for all. The capital invested in buildings for industry is in the larger sense also the property of all and negligence which results in losses by fire is equally criminal and equally the burden of everyone.

An Appreciative Word

THE Hospital Buyer carries every month a series of helpful messages to every hospital in the United States and Canada. Among the contributors to its columns are Dr. Robert Moulton of the Institute of Meat Packers and Roscoe Hart Shaw of our own Nutrition Laboratories, who have written a series of six articles on food value of meat and bread. These studies in nutrition have so interested the editor of The Hospital Buyer that a recent issue carries this appreciative reference to them: "For months and months I have been dreading the day when Doctor Moulton and Doctor Shaw would have finished their articles on 'The Food Value of Meat' and 'Bread's Place In The Diet.' Maybe I am no judge of these things, but in my opinion these are absolutely the best papers on diet which have appeared in recent times, and a real contribution to the subject"

"Science has made more secure and satisfying the answer to the universal prayer to 'give us this day our daily bread,' by its constructive work in every branch of food production, including the improvement of cereals, their milling and baking."

—From Commencement Address,
Massachusetts Agr. Col.

Books for the Baking Laboratory

OFFICIAL AND TENTATIVE METHODS OF ANALYSIS OF THE ASSOCIATION OF OFFICIAL AGRICULTURAL CHEMISTS. Second Edition, revised to July 1, 1924, 535 pp., Washington, D. C.

The second edition of the Official Method of the A. O. A. C. compiled by the Committee on editing methods of analysis, R. E. Doolittle, Chairman, is a welcome publication. Dr. Doolittle has worked faithfully and arduously on this revision of the first edition published in 1920, and both his Association and the agricultural, food and drug chemists of the country, are deeply indebted for what has been accomplished in arranging the contents of this very necessary volume for the laboratory.

The methods of analysis of the A. O. A. C. have been continually studied by collaborative work for over forty years, and the official methods are only adopted after thorough trial, criticism and discussion by the members.

Since the active personnel of the A. O. A. C. is composed of Federal and State officials engaged in agricultural, food, and drug inspection work according to existing laws the responsibility for the adoption of these methods rests solely upon the action of official chemists, though the Association has lately followed a liberal policy by fostering participation in the study of the methods by interested industries and institutions engaged in similar work.

The methods have an authoritative standing before the Federal and State courts in legal proceedings involving agricultural products, fertilizers, insecticides, feeding stuffs, and the pure food and drug laws. During recent years the A. O. A. C. methods have become generally recognized in the control work of many agricultural and food industries prominently among which are those of baking and milling.

It is therefore most essential that baking and milling chemists should keep in close touch with the methods of the A. O. A. C. in their laboratory and control work in the interests of uniformity and the food laws.

The present revision is a great improvement in arrangement and contents over the first of 1920. The chapter on cereal foods has been greatly expanded and now includes tentative methods for baked cereal products and an important section on the analysis of alimentary pastes. While methods for the analysis of bread have not yet been adopted, some of the necessary determinations

are being studied by the Association in connection with the current program of the referee on cereal foods.

Revisions of official methods adopted prior to July 1, 1924, for the analysis of wheat flour are given with the description of the procedures for moisture and ash. The use of the factor 5.7 for the conversion of nitrogen to protein is required both for wheat flour, and wheat used for manufacturing purposes or human food.

The chapters on Feeding Stuffs, Preservatives and Artificial Sweeteners, Coloring Matters in Foods, Metals in Foods, Sugars and Sugar Products, Baking Powder and Baking Chemicals, Spices and Condiments, Vinegar and Flavoring Extracts are of especial importance to all chemists engaged in the laboratories of the baking industry.

In conclusion, the new book of methods is to be commended for improvement in clarity of expression as compared to the first edition. It has often been remarked by critics that the usual collection of analytical methods is nothing more than a kind of chemist's cook book full of pitfalls for the unwary. Dr. Doolittle and his colleagues seem to have given the requisite attention to this problem with commendable success despite the acknowledged difficulties of the task.

C. B. Morison.

Abstracts of Technical Articles

Selected for Baking Technology from Chemical Abstracts

A study of methods for making protein tests on wheat. D. A. Coleman, H. C. Fellows, and H. B. Dixon. *Cereal Chem.* 2, 132-64 (1925).—No uniform method is used by the different laboratories. Three general types of methods, with various modifications, were used by 38 laboratories. The results showed a maximum difference of 3.15%. It is suggested that a referee laboratory should be established to settle disputes of any nature, arising out of the practice of making protein tests. Details of the methods are well discussed and certain recommendations are made.

Ruth Buchanan.

The testing of flour and baking materials in the laboratory. Artur Fornet. *Chem. Ztg.* 49, 347-8 (1925).—F. discusses the importance of the baking test, and gives a description of a baking oven for the laboratory. The capacity is 100 grams flour, producing a cake of about 135 grams. The baking process lasts 20 minutes. The volume of the baked product, which is very important, and which usually takes considerable time, can be determined in a few seconds. An illustration of the oven and of the exact size of a cake from 100 grams of flour are given. J. C. Jurrjens.

Triers for sampling flour. H. E. Roethe. *J. Assoc. Official Agr. Chem.* 8, 424-35 (1925).—The H₂O content of sacked flour near the outer surface at times differs materially from that at the center. A correctly designed trier should remove proportionate quantities of flour from the various zones, the quantity taken from each zone being determined by the % volume of the entire sack represented in such zone. Neither the 30-in. tubular trier nor the Jabez Burns & Sons No. 4 trier fulfills this condition. Five different types of triers which fulfill the condition to varying degrees of approximation are submitted for consideration. A. Papineau-Couture.

Milk in bread. A. F. Gerhard. *Northwestern Miller* 142, 829 (1925).—A detailed description is given of the use of fresh, homogenized, pasteurized, powdered, evaporated, condensed and skimmed milk and buttermilk in bread. The distinction between the milks is defined. Adulterants and preservatives are discussed. Comparative analytical results and comparative costs of the use of these various milks are mentioned. It is in reality cheaper to make milk bread than water bread.

Ruth Buchanan.

Unbiased scientific service for the manufacturer. How the laboratory helps the food executive protect the consumer. W. H. Eddy, *Am. Food J.* 20, 173-4 (1925).

J. A. Kennedy.

Studies on cereal flours. III. R. Fanto and R. Herzner. *Z. Nahr. Genussm.* 49, 153-63 (1925); cf. *C. A.* 7, 1560; 9, 109.—Prepare H₂O extracts as follows: Transfer 5 grams flour to a 250 cc. flask using 50 cc. H₂O, and shake with a machine for 1 hour, 35 vibrations per minute. Centrifuge at 3000-4000 revolutions per minute for 1 hour and filter through paper. Determinations were made of

total and H₂O-soluble ash, and of total and H₂O-soluble protein. Ratio of H₂O-soluble protein (N) over H₂O-soluble ash (A) was calculated for each sample. Mixing extracts from 2 flours often gave a precipitate. Wheat, rye, barley, buckwheat, and corn of various degrees of milling were compared. Two samples with N/A ratios far apart gave considerable precipitation when mixed, while there was little or none otherwise. The precipitation is attributed to the lecithin of one and albumin of the other extract forming an absorption compound. In milling when the germ is not entirely removed there is most lecithin in the H₂O extract. It is believed that previous determinations of albumin in flours may be in error because of precipitation of albumin by the lecithin present. Before extracting the albumin with H₂O, the lecithin should first be extracted with ether.

Frank E. Rice.

The milling value of wheat. Gunnar Molin. *Kgl. Landtbruks-Akad. Handl. Tid.* 64, 231-8 (1925).—M. gives a brief but comprehensive discussion of the colloid chemistry of hard wheat flour in relation to its bread-making value.

C. O. Swanson.

Study of the properties of wheat starch and the baking qualities of flour. G. G. Naudain. *Am. Food J.* 20, 250-1 (1925).—This paper covers a series of 3 main experiments: (a) a microscopic study of wheat starch to determine the effect of acids, bases, and salts on the swelling of the grains, under various conditions of time and temperature; (b) a similar study on wheat flour and starch from wheat flour to determine the effect of reagents on viscosity; (c) a study of the imbibition of wheat flour and starch from wheat flour. Conclusion: (1) The number and size of starch grains of a wheat flour indicate the quality of the flour. The larger proportion of small starch grains indicates a good grade of flour. (2) The imbibitional study of the flour and starch from the flour indicates that the gluten is the more important factor. This is shown by the fact that the starch from a good flour has a lower value of imbibition than the starch from a poor flour. (3) The influence of the starch on the baking strength of flour might be indicated in the resistance of the starch grains, since it has been shown that the smaller starch grains are the more resistant to heat, moisture and chemicals.

J. A. Kennedy.

Oh, What a Dud Was Manley's

A DUD is a bombshell that doesn't explode. And all it amounts to is a lot of expense to the organization which fired it. Many shells have been fired at the baking industry but no direct hits have ever been recorded. But the list of duds is a long one. And the latest one is the effort of Basil Manley through his People's Legislative Bureau to resurrect a new scarecrow with which to justify the need of his "bureau" from the limbo of year before last winter's abortive efforts to stir up trouble for millers and bakers through the so-called LaFollette Senate resolution.

But the new scarecrow is the same old bird, plucked naked by the very Federal Trade Commission which is now to be bludgeoned into again investigating industries which need no other regulation than that which every housewife can make whenever she feels that the bread which furnishes her more good food for less money than any other food she buys is costing her more than it fairly should.

As a matter of fact the horrid bakery combination, trust, menace or whatever Basil Manley weirdly dreams the more than thirty thousand bakers of the United States are forming, is just another foolish hobgoblin set up as Halloween approaches to scare timorous children. For no grown person will ever be afraid of a "trust" taking away from every kitchen the combination of bread pan, sack of flour, yeast cake and kitchen stove which is wholly able to protect every American family from any trust octopus which in the fearful mind of the Basil Manleys is creeping up to snatch the bread of life from the hungry mouth of an unprotected public.

And yet with faith in the power of a letter to the Federal Trade Commission to vitalize the dud fired months ago and

long since forgotten even by those who supplied the powder to push it out of the muzzle of the paper cannon which launched it against a well fed and contended people, dog days brought another dud from the Bureau and those who had the patience to read all the items in the daily grist of news perhaps found an obscure paragraph which told again the story of the "bread trust" and the hope of the People's Legislative Bureau to "bust" it.

The first dud fired against the "trust" exploded with a bang which spattered the story all over the front pages of first editions. The last dud didn't have enough pep to burst at all.

Well, anyway, it was a real effort even if no one was scared or even interested, and perhaps another of the self appointed nurses of a public which isn't a bit in need of nursing has learned that even children are no longer to be frightened by Little Orphant Annie stories.

Three Times A Day

"I read in the paper recently your statement that pie is a real food. I heartily agree with all you say. I have long maintained that pie should be the first and only course of every meal but I have found it impossible to bring my mother to my way of thinking. So I have been forced to subsist on rice, potatoes, cabbage, spinach, bread, and such things and I am consequently thin.

However, this is only a secondary reason for writing. My first and most important reason for communicating with you is to request that, in case you should make another experiment on the effects of pie eating, you should choose me as your subject."

—Alfred Rogers.

BAKING TECHNOLOGY

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in Baking*



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Present or Accounted For

WHEN the story of the greatest of all the great conventions of the baking industry shall have become the common knowledge of every baker everywhere, when the last of our guests from far distant countries has again reached his home and when the records of progress and achievement made that eventful week at Buffalo are set down for all other conventions of the food industries to emulate, it will be time enough to write finis to our 28th annual convention. But now while every achievement of the greatest week the baking industry has ever recorded is fresh in our minds we

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cannot think of the Buffalo Convention as a thing that has passed. Rather its constructive work is but starting, and through the months and years ahead the impetus given every association activity will gather added force and take more definite direction.

The dominant idea of every conference at Buffalo was the need for education. The one obvious motive in every gathering was the desire for knowledge. Men

came to Buffalo to learn; they eagerly attended the special meetings where their interests lay that they might ask questions and gain help. And wherever they gathered they found the information they

wanted, freely given, with none of the hesitancy about revealing trade secrets which has retarded the progress of the industry in other years.

It is nearly six years since American Institute of Baking was established. In those years it has been developing its work in research, in service, and in education. At Buffalo the Institute for the first time received recognition from every group within the baking industry as the heart of the great body of bakers, beating strongly and steadily with the single purpose of serving every unit in the industry and so the better serving the public, sending out its rich streams of influence to build a finer appreciation for the baker's efforts, enriching every department of the shop with sound suggestions for improvement, carrying to the most remote member the stimulant of class consciousness, and always creating for every baker a larger need for his service.

When the Institute was organized it was hoped that its work would be carried on with funds earned by its endowment. But the million dollars which seemed necessary for that purpose was not raised. Hardly one-half of that amount was subscribed and more than forty percent of the total subscription is still uncollected. It has been necessary, therefore, for the Institute to earn its keep, to secure much of the funds required for the support of its laboratories and school through service and tuition fees and through endowments and scholarships generously provided by those interested in its work. And always it has been the chief desire of American Bakers Association to see the work go on, to grow and expand its field of effort, and to this end it has placed all of its resources behind the Institute and made its development the outstanding purpose of the Association.

The wisdom of the leaders of the Association during the years which have passed since the Institute began its work became definitely apparent at the Buffalo Convention. If there were any who doubted the soundness of the judgment of the men who, year after year, through trials and discouragement, worked to keep the Institute going forward, that doubt is now dispelled. And behind the Board of Governors of the Association and the Directors of American Institute of Baking is now aligned the united support of the whole baking industry, with all of its allied trades and co-workers in the production of baked goods.

The influence which crystallized the sentiment of the convention so definitely was the splendid gift of the Robert Boyd Ward Fund, Inc., of \$100,000 for the support of a department of the Institute to be known as the Department of Nutritional Education. And following immediately after came the report of the Committee of the Julius Fleischmann Memorial Fund which proposes to establish for the support of education a fund, created by the men who knew Julius Fleischmann and who through his devotion to their interests were able to achieve success, and held and administered by American Bakers Foundation.

With such splendid support assured, it will be possible for the Institute greatly to extend its facilities for service. Already plans are developing through which special groups within the industry who have had no technical assistance or educational advantages will be given much needed assistance both through research and the operation of schools for the training of men for their service.

More than 7,200 bakers and those associated with the baking industry attended the convention and exposition at Buffalo. It was their interest in the work of the Association and Institute which gave to

every Governor, every committee chairman, every staff member, the confidence which so quickly became a definite assurance that they could count on the industry to generously support their every effort in its behalf. And in the weeks which have passed since the convention came to an end and the exposition closed its doors the great body of men who could not go to Buffalo have heard the story of that great week and felt the inspiration which flowed, Niagara-like, into the consciousness of every progressive baker. They were not present to take part in the conferences; they had to miss the inspiration of the splendid exposition; they could not carry back to their shops the overflow of enthusiasm which filled the great armory and permeated the hotels, but they are hearing the stories of that week as they are told in the trade papers and retold by every salesman who is so fortunate as to be able to say as Caesar did, "all of which I saw, part of which I was." And while they could not answer "present" when the long roll was called at Buffalo they now, in every state and city and town, are conscious of a new spirit in their industry, and they have a new optimism, a greater faith in the future, a stronger belief that they are indeed the first among the essential servants of man. They are accounted for.

Pie for Children

What has it meant to the baker of pies to be able to refute the old, old notion that pie crust was indigestible, and that apples baked between crusts were less wholesome a food than when eaten as apple sauce with bread and butter? The development of the pie industry is but started. But every step of its progress will be based on proven fact as to the suitability of pie as a food for children. And that is the work of our Institute.

Women and Wastes

WASTE in industry must be considered under three phases, the waste of raw materials, the waste of labor and capital engaged in production, and the waste of distribution. Woman is not greatly concerned in the first of these wastes and her interest in the second is largely limited to the part she plays in modern industry, but her interest in the third phase of the subject, that of distribution, is of prime importance.

It has often been said that 85% of the purchases of the home are made by women. She may not grow the raw materials from which her foods are manufactured, but she selects them, brings them to the home and prepares them for the table. She may know little of the production of wool, silk, or cotton, or of the manufacture of those materials into fabrics, but her choice and her utilization of those fabrics determine almost entirely their use in the home. She may count the cost of the bread which is delivered at her door almost wholly in terms of the value of the flour from which it is made, but she should understand that in the cost of the loaf at the kitchen door is a long series of costs which reach back to the farms where the wheat and milk and shortenings which enter into it are produced.

And one of the most important costs of the loaf of bread, as of every other commodity which under the modern system of business operation is taken to the door of the consumer, is that of delivery.

Transportation of raw material from the far corners of the earth to the place of manufacture has been constantly lowered and today freight is moved at a cheaper rate per ton mile than ever before. Facilities for handling such material in transit, in storage and in manufacture have been so splendidly developed

that the picture of long lines of women coaling merchant ships in some far eastern port is remarked as the very antithesis of our efficient mechanical ways of replacing human effort by labor saving devices.

Retail Distribution Costs

But the final step in the long road which stretches far back to the source of raw material, the short mile which separates woman in the home from the retail store where her household purchases are made, is more costly today than ever before. And the simple process of delivering a wrapped package at the kitchen door often costs more than the producer received as his share of the final price.

Such a condition is worthy of most careful study. If in our efforts to build up successful competitive business a condition has come about where seven milk wagons pass the door without stopping, where as many ice wagons drive back and forth between customers' homes, where half a dozen groceries struggle for existence in a single block, where foolish competition makes two drug stores spring up where one grew before, we must realize that a waste of labor, of invested capital and of the earnings in the family purse is the inevitable result.

During the great war our man power was mobilized. Millions of men and women stepped from their places as workers in non-essential industries to take a splendid part in the great army which fought its battles three thousand miles behind the firing line. It appeared for a time as if some of the savings in industry which were forced by stern necessity would persist and remain for us as one of the assets of the war.

But most of those savings have been turned back to the same wasteful practices of pre-war days. And in the years since then a multitude of other wastes have entered our lives.

An Unsolved Problem

The efficiency which has entered home operations with the development of labor saving devices is not in evidence in the alley in which a two ton truck stops to deliver a ten cent package. No method has yet been devised which will reduce the cost of taking a pair of shoes from the retailer's shelf and leaving them at the home of the purchaser. No business practice has yet been perfected which will stop the waste incident to the exchange of carelessly purchased articles.

The remedy, if it is to be found, rests with the purchaser, with women in the home. They need not go to the source of raw material to study wastes, nor to the factory to investigate the methods of manufacture. But they can find in their neighborhood grocery, in fruit and meat markets, and in the procession of delivery wagons which pass their door a major problem to be solved.

For no waste in industry is more obvious than the waste of personal service which a dozen times a day may be studied by every homemaker.

A Fourth Meal at Four

The suggestions made a year ago that our children would be the better nourished if they were given a fourth meal has already caught the imagination of thousands. On the Pacific Coast it has been developed into a splendid movement which is crystallized around the slogan, "A Fourth Meal at Four." A recent nationally posted advertisement shows two hungry children standing before the window through which their mother is passing them tempting sandwiches to nourish them as they play through the afternoon hours till supper time.

"No table without bread, nor no army without a captain."

The American Baking Industry 1849-1923

AN OUTSTANDING contribution to the baker and to every student of food economics is the report issued by the Food Research Institute of Stanford University, California, entitled *The American Baking Industry, 1849-1923, As Shown in the Census Reports*.

The authors of this comprehensive study of the baking industry are Hazel Kyrk, Ph.D., Associate Professor of Economics in the University of Chicago, and Joseph Stancliffe Davis, Ph.D., Director of the Food Research Institute, and to them every baker will wish to give grateful credit.

The baking industry heretofore has had no recorded economic history. Such data as has been gathered by the Bureau of the Census has not been interpreted nor related to similar reports of other decades. No adequate summary of the report is practical, nor should it be attempted, for every baker and every one who is interested in the baking industry will wish to familiarize himself with its text, charts and tables. The text discusses in several chapters the present position and growth of the baking industry, its economic and financial aspects and its personnel and wages. The charts and tables are perhaps the most important feature of the work since they show in most graphic fashion the growth of the industry during the 75 years of its greatest development. It will be a source of much satisfaction to every baker to study the details which show that his industry ranks high among such great industries as iron and steel, automobiles, and clothing manufactures. The business of baking is exceeded only by meat packing and by flour milling in the value of its products, while in the value added by manufacture and the number of wage earners

to whom it gives employment it is surpassed by the meat industry alone.

One point of much interest is the reference to the census of 1919 which shows that while but 7 1/2 percent of the product of all manufacturing industries was produced by plants turning out an annual product of less than \$100,000, over 42 percent of the product in the baking industry was produced by these smaller plants.

The report further states that while there is a tendency toward large scale production in the baking industry, the scale is far below the average of all American industries and seems likely to remain the characteristic of baking concerns which produce primarily bread and baked goods other than biscuits and crackers.

The data gathered in this report and critically analyzed is of the more importance at the present time because of the too frequent allegations that the baking industry is taking on the aspects of a trust. The impossibility of such an economic development will be apparent to every one who studies the report.

The Food Research Institute is to be congratulated upon the preparation and publication of this authoritative study of the baking industry. It is to be hoped that every baker who is interested in his industry will place a copy on his desk.

More Bread, Better Fed

And more food should mean more bread, the bread which has been slowly slipping out of our dietary to make room for sugar, and which has been subtly pushed into the background by the host of special foods, of prepared foods, of strange and new and different foods which year after year in ever increasing volume flow into our kitchens from every corner of the world.

BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

H. E. BARNARD, Editor

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OCTOBER 15, 1925

We Work Together

To win through knowing our markets and developing their full potential possibilities, a higher place for the baking industry in the great family of America's business life.

After Buffalo—What?

THE Twenty-eighth Annual Convention of the American Bakers Association, with its high mark of attendance, its marvelous exhibits never before equalled, the co-operation of all allied or associated industries and associations, the splendid gift to American Institute of Baking of \$100,000 from the Robert Boyd Ward Fund, Inc., the adoption of plans for raising a Julius Fleischmann Memorial Fund, teemed with an interest and a spirit never before in evidence.

Was the Buffalo Convention a climax? Will a reaction follow? Was it a "big night" to be succeeded by a dull, drab "morning after?" Or was Buffalo a real awakening, a showing of new Association growth and strength?

For centuries baking was a home enterprise or was confined to community retailing; within a generation it has grown and ramified with incredible swiftness.

We have:—

- (1) Wholesale bakers using in manufacturing and distributing all the machinery and mechanical equipment that a machinery age has been able to devise, with scientific accounting, advertising and merchandising.
- (2) Bakers who manufacture in a large way but deliver to the consumer.
- (3) Specialty bakers devoting their entire attention to a few items among the hundreds of bakery products.
- (4) Grocery stores who have entered the baking business.
- (5) Wholesale bakers who are distributing grocery lines.
- (6) Window bakeries, general and specialty, located on busy streets where many can see the baking process and be tempted to buy.
- (7) Wholesale bakers operating their own retail distributing stores.
- (8) Retail bakers selling over the counter either in a residential community or in a business section.

All were represented in Buffalo, all profited, all were amazed.

We are all back home. We are back on the job trying to build up our own individual efforts which mean our livelihood.

Never in the history of the industry have there been so many opportunities for every baker as there are today.

AFTER BUFFALO,—WHAT?

Bring your friends and competitors into an active membership in the American Bakers Association.

Support the Institute of Baking.

Subscribe to the Julius Fleischmann Memorial Fund.

Get ready for 1926, and—

**A BETTER, BIGGER, BUSIER,
BAKING INDUSTRY**

L. J. SCHUMAKER,
President.

Bread, the Life Giver

THROUGH the ages bread has been the symbol of life-giving food. It is today the leading food of hundreds of millions. All other foods follow it into consumption.

When the baby leaving its mother's breast cries for more food it finds strength and vigor in bread.

Bread feeds the men who do the world's work. It is the substantial food in the dinner pails which line the roadside and the factory wall, wherever hard labor wrests with raw materials.

Bread is the common symbol of values in the market place. When bread prices advance every consumer knows it and asks why. But the price of every other food varies from day to day and the fact passes unnoticed.

Bread is the one staple found on every table and the one food whose absence is remarked when the bread box is empty.

Undernourished Children

NEVER before in our history has so much interest been taken in the nutrition of children as today. And never have the studies of child health so definitely pointed out insufficient and improper food as the causative reason for the malnutrition which retards the development of from thirty to fifty per cent of our children.

If it appeared that these undernourished children were born of poor parents, nurtured in slums, surrounded by every bad environment, it might be possible to point to unbalanced diet, and lack of food as the primary cause of these disturbing conditions. But it is not alone the children of the poor who are malnourished. Quite as often the poor little rich girl is thin, anemic, underweight, physically below par.

Certainly no lack of variety in children's food is generally responsible for these findings of our school nurses. Nor is it prob-

able that there is some definite vitamin insufficiency in the food intake of the average American child. Unquestionably many children need more milk with its life-giving, growth promoting fat soluble vitamins and more leafy vegetables or vitamin potent foods. And many more rickety children would find health in cod liver oil. But the usual need of malnourished children is more food, well selected, provided in sufficient quantity to quell the hunger calls, always available when the body cells need more protein or fat or carbohydrates or minerals and vitamins to supply building material and energy.

An Association Ideal

"Make no little plans; they have no magic to stir men's blood and will not be realized. Make big plans; aim high in hope and work, remembering that a noble and logical plan will never die, but long after we are gone will be a living thing."

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

of BAKING TECHNOLOGY, published monthly at Chicago, Ill., for September, 1925.

State of Illinois, } ss.
County of Cook, }

Before me, a Notary Public in and for the State and County aforesaid, personally appeared H. E. Barnard, who, having been duly sworn according to law, deposes and says that he is Editor of BAKING TECHNOLOGY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, American Institute of Baking, 1135 Fullerton Ave., Chicago, Ill.

Editor, H. E. Barnard, 1135 Fullerton Ave., Chicago, Ill.

2. That the owners are:

American Institute of Baking, a Corporation formed not for profit,
H. E. Barnard, Manager.

L. J. Schumaker, President, acting for American Bakers Association.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

None.

H. E. BARNARD.

Sworn to and subscribed before me this 25th day of September, 1925.

(Seal) Rosabelle E. Priddat, Notary Public.
(My commission expires August 24, 1926.)

The Composition of Cakes

By WM. C. LUCKOW

Technical and Service Department, American Institute of Baking

IN THE July number of Baking Technology we published an article on the composition of pies. We have recently completed an investigation of the composition of commercial cake and our results are given in this paper. Sherman* has reported the work of several investigators and additional work has been done by other analysts. The analytical work reported in this paper was performed by the writer and V. A. Gant of the Technical and Service Department.

Materials Studied

Five of the most popular kinds of commercial box cakes were purchased from local grocery and delicatessen stores. The cakes selected were all manufactured by the same large bakery and included gold cake, sponge cake, silver cake, chocolate layer cake and devils food cake. Two cakes of each kind were purchased so that we would have plenty of material to work with and so that more representative samples would be obtained. In some cases we could not obtain two cakes of one kind from the same dealer and it was necessary to purchase the other cake elsewhere. It is not known how much time had elapsed between the time of baking and the time of purchase of these cakes but some of them were undoubtedly fresh stock while others may have been at least several days old. Although some of the cakes were fresher than others they were all in good condition.

The gold cakes were golden yellow in color and had a white frosting about one-eighth inch thick on top and weighed about eight ounces each. The sponge

cakes were yellow in color and weighed about seven ounces each.

The silver cakes were pure white in color and had a white frosting about one-eighth inch thick on top and each cake weighed about eight ounces. The chocolate layer cakes were brown in color and had a chocolate icing on top and a soft creamy chocolate filling between the two layers. Each cake weighed about eight ounces. The devils food cakes were brown in color and had a white frosting on top. Each cake weighed about eight ounces.

The cakes were wrapped in waxed paper and sold in light cardboard boxes with frequent deliveries so that the consumer may find the cakes in good condition when he purchases them from the retailer.

Method of Preparing Samples for Analysis

Upon unwrapping the various cakes it was found that in many cases the frosting adhered to the waxed paper. In order to get the correct weight of the cake and also to include all of the frosting in the sample the frosting was carefully scraped from the waxed paper by means of a knife. The material thus recovered was added to the main bulk of the cake. The two cakes of each kind, carefully unwrapped as described, were weighed and the combined weight noted. The weighed cakes were then placed on a sheet of paper, sliced into thin slices and allowed to dry in the air for about a week. After they appeared to be dry they were again weighed and the "air dry" weight noted. These air dried slices were then ground up by hand in a large mortar until the

*Sherman, "Food Products," 1924 Ed., p. 327.

material was very fine, care being taken to thoroughly grind up the frosting and mix it with the other material. This was rather troublesome since after air drying the frostings became very hard and were difficult to grind. We attempted to grind these cakes in a bread grinder but found that it could not be done on account of the frosting.

The ground air dried cakes were thoroughly mixed and placed in tightly stoppered fruit jars. These air dried samples were used for all of our analytical work.

Methods of Analysis

Moisture: The moisture in the air dried samples was determined by drying 5 grams for five hours in a vacuum oven at a vacuum of about 28 inches, and a temperature of 100° C. The total moisture in the cakes as purchased was calculated from the loss of air drying and the loss on vacuum drying the air dried samples.

Ash: Ash was determined by igniting 5 gram samples in an electric muffle furnace at a low red heat.

Protein: Protein was determined on 1 gram samples by means of the Gunning Method. (A.O.A.C. 1920 ed., p. 7.)

Fat: The fat was determined by the tentative method. (Journal A.O.A.C., Volume 8, No. 2, p. 109.)

Crude Fiber: Crude fiber was determined by the method of the A.O.A.C. (A.O.A.C. 1920 ed., pp. 97 and 98.)

Nitrogen Free Extract: Nitrogen free extract was determined by difference. Nitrogen free extract includes such items as starch, sugars, etc.

Sodium Chloride: Sodium chloride was determined as follows: 10 gram samples were charred at a low temperature and the resultant black mass then leached with water several times to remove most of the sodium chloride. After

this the remaining material to which the filter paper had been added was ignited at a low red heat until the carbon had been burned off. The ash from this ignition was then taken up with water and concentrated nitric acid added. The resulting solution was then added to the original filtrate in the beaker and chlorine was determined by the Volhard method.

Lime: Lime was determined in a solution of the ash by precipitating as calcium oxalate from a solution containing ammonium acetate and acetic acid. (A.O.A.C. 1920, pp. 283 and 284.) The calcium oxalate so obtained was then ignited and weighed as calcium oxide. Ten gram samples were used.

Phosphate: The phosphate was determined in a solution of the ash by precipitation as ammonium phosphomolybdate followed by titration with standard alkali. (A.O.A.C. 1920, p. 3.) Two gram samples were used.

Starch: Starch was determined by the diastase method with subsequent acid hydrolysis as given in the A.O.A.C. (A.O.A.C. 1920 ed., p. 95.) The diastase solution used, however, was much stronger than that recommended by the A.O.A.C.

Sugars: Reducing sugar and sucrose were determined by the methods of the A.O.A.C. (A.O.A.C. 1920, pp. 94 and 95.) In some cases a further dilution of the sample was necessary.

Results

The analyses of the cakes are shown in Table I. The analyses are reported in three ways (1) as received, (2) air dry and (3) dry. All of the analytical work with the exception of the original moisture determination was done on the air dried samples and the values "as received" and "dry" were calculated from the "air dry" results. The calories per

TABLE I

Showing the Chemical Composition of Cakes as Sold, Air Dried and Moisture Free.

Kind of Cake	Gold			Sponge			Silver			Chocolate Layer			Devils Food		
Weight of 2 cakes as received	459.5 grams			372.6 grams			463.9 grams			471.7 grams			534.5 grams		
	As re- ceived	Air Dry	Dry	As re- ceived	Air Dry	Dry	As re- ceived	Air Dry	Dry	As re- ceived	Air Dry	Dry	As re- ceived	Air Dry	Dry
Moisture	23.62	4.46	0.00	22.00	5.93	0.00	25.04	5.20	0.00	21.72	4.07	0.00	24.46	5.27	0.00
Ash	1.20	1.50	1.57	1.63	1.97	2.09	1.08	1.37	1.45	1.13	1.38	1.44	1.44	1.81	1.91
Protein (Nx6.25)	5.28	6.61	6.92	6.53	7.88	8.38	4.74	5.99	6.32	4.78	5.86	6.11	6.63	8.31	8.77
Fat	9.43	11.79	12.34	5.14	6.20	6.59	5.58	7.06	7.45	5.65	6.93	7.22	7.27	9.12	9.63
Crude fiber	0.27	0.34	0.36	0.22	0.27	0.29	0.30	0.38	0.40	0.44	0.54	0.56	0.30	0.37	0.39
Nitrogen free extract	60.20	75.30	78.81	64.48	77.75	82.65	63.26	80.00	84.38	66.28	81.22	84.67	59.90	75.12	79.30
Starch	21.01	26.28	27.51	20.30	24.48	26.02	16.23	20.52	21.65	11.94	14.63	15.25	15.00	18.81	19.86
Direct reducing sugar as invert sugar	1.38	1.73	1.81	0.84	1.01	1.07	1.39	1.76	1.86	0.95	1.16	1.21	2.07	2.60	2.75
Sucrose	33.63	42.07	44.03	18.13	21.86	23.24	18.45	23.34	24.62	21.94	26.89	28.03	16.14	20.24	21.37
Sodium chloride	0.28	0.35	0.37	0.21	0.25	0.27	0.43	0.55	0.58	0.09	0.11	0.12	0.32	0.40	0.42
Calcium	0.04	0.05	0.05	0.04	0.05	0.06	0.03	0.03	0.03	0.04	0.05	0.05	0.04	0.05	0.05
Phosphorus	0.18	0.22	0.23	0.28	0.34	0.36	0.08	0.10	0.11	0.21	0.26	0.27	0.17	0.21	0.22
Calories per lb. . .	1573	1967	2059	1498	1806	1920	1461	1848	1949	1520	1862	1941	1504	1886	1991

TABLE II

Showing the Composition of Cakes as Compared to Breads when Calculated to the Same Moisture Content of 38 Per Cent.

	All Milk Bread	Whole Wheat Bread	Gold Cake	Sponge Cake	Silver Cake	Chocolate Layer Cake	Devils Food Cake
Moisture	38.00	38.00	38.00	38.00	38.00	38.00	38.00
Ash	1.61	2.08	0.97	1.30	0.90	0.89	1.18
Protein (N x 6.25)	9.46	9.62	4.29	5.20	3.92	3.79	5.44
Fat	3.20	2.76	7.65	4.09	4.62	4.48	5.97
Crude fiber	0.22	1.93	0.22	0.18	0.25	0.35	0.24
Nitrogen free extract. . .	47.51	45.61	48.87	51.23	52.31	52.49	49.17
Calcium	0.08	0.04	0.033	0.035	0.020	0.029	0.033
Phosphorus	0.10	0.25	0.14	0.22	0.07	0.17	0.14
Calories per pound. . . .	1164	1115	1277	1190	1208	1203	1234

pound were calculated from the analytical data.

Table II shows the chemical composition of the cakes analyzed in comparison with milk and bread and whole wheat bread. In order to make the comparisons possible all data is calculated to the same moisture content of 38 percent.

Relative Values of Bread and Cake

A study of the analytical values given in Table II shows several interesting results, and compels a revision of the usual

ideas as to the nutritive value of cake as compared to bread. While cake is commonly described as a "rich" food and so unsuitable for children the facts are to the contrary. Cake, made as it is from flour, eggs, sugar and butter, is no richer than its component parts, all of which, when used in proper amounts, are excellent foods, and all of which in other forms constitute an important part of the diet of children. The protein content of cake, due to the use of flour with a weaker gluten content, is somewhat lower than

in bread. The sucrose or sugar content is higher, both because of the sweetness of the cake and the frosting commonly applied to the top.

But the sugar content is not as high as that of other sweet foods and is less than a third as high as in candies, and since physiologically it is converted to simple sugars by intestinal juices, the ultimate effect of eating cake with a sugar content of from 14 to 25 percent and a starch content of 15 percent is no different from that produced by eating bread with a lower sugar and a higher starch content.

The fat content of cake is higher than that of bread. But bread is rarely eaten except when spread with fat. In practice therefore far less fat is consumed with cake containing butterfat as a component than when buttered bread is eaten. Indeed in actual practice buttered bread has more than twice the fat content of cake.

When the customary measure of the calory value is applied to cake and bread it is found that there is very little difference between these two staple foods. They are both high in carbohydrate content but they also contain considerable protein, varying amounts of fat, small amounts of calcium and phosphorus, vitamins in accord with the milk and egg and butterfat used in the formulas and a total energy value higher than any other staple food which is adapted to generous use at every meal.

"We enjoy reading *Baking Technology*, and last year during a session of the State Legislature a number of copies were presented to the Legislative Committee on Baking and furnished just the information they desired."

—Jane H. Rider,
Arizona State Laboratory.

A Royal Wedding

THE wedding announcements of two prominent families have lately been sent out to an interested world. They record the alliance entered into by the American Institute of Baking and the American Medical Association when, in the graphic words of the editor of the house organ of a prepared wheat food, they "marched to the altar of absurdity to take their vows against natural, unadulterated, God-given food."

Without discounting by a single jot or tittle the serious import of this wedding of mutual interests to the whole galaxy of adventurers into the realm of sound nutrition, the great American family which relies on its physicians for medical advice and attention and on the many and varied products made from wheat for its basic food, will rejoice at the announcement and rest the more content in the knowledge that the science of nutrition and the art of the miller and baker has been merged in a common effort to better feed and nourish its every member.

If efforts joined to this end reveal any absurdities or unholy alliances they will be found only by the rapidly diminishing group whose scientific knowledge consists of reiterated assertions of disproved and misinterpreted facts. Is there anything sinister in the joining together of the interests whom society rests for protection against disease and of those charged with the duty of feeding the human family. To the sane, logically minded, ninety-nine per cent who believe in the value of expert and unprejudiced knowledge, the nuptials of such organizations as the American Medical Association and American Institute of Baking will bring only confidence that the well-being of their children and the proper nutrition of every member of their family is the better assured.

Up From The Soil

The Story of Wheat from the Field to the Table as Told in a Volume from The Manhattan Library of the Bank of the Manhattan Company

Wheat in the shock is not bread on the table and the railroad that hauls wheat to the mill and the miller who grinds it into flour are as essential to the baking of bread as the farmer who sows and reaps his golden harvest. The role of railroad and miller in the production of our basic food follows in this fourth installment of **Up From The Soil**.

Chapter Seven

MOVING THE CROP

WHEAT on the farm is not bread on the table. There was a time when the farmer put his garnered grain into the wagon, hauled it down to the neighboring mill, waited while it was ground and then carried back flour and feed that his wife might make bread and his horses and cattle might have their bran.

Then a railroad was built across the prairie and the farmer who was fortunate enough to be on the line saw new wealth coming to him. The railroad would carry his wheat to someone in the city who would give the farmer real money for it instead of the flour and bran that formerly he brought back from the grist mill. Farmers whose land was far from the line saw the new way by which their more fortunate brothers could turn their golden grain into gold coin of the realm—and sought railroads for their farms.

In that day wheat growers fully realized the value of transportation for their crops. They gave rights of way and subscribed to the stock of railway companies in order to induce extension.

That clear understanding of the interdependence between parts of the developing economic system has been beclouded in recent years. The Government at

Washington only recently was asked to reduce freight rates on grain in order that the farmer might benefit thereby, but the widespread discussion which ensued served effectively to disclose the fallacy of the supposed remedy.

But in the discussion it was found that the transportation charge is so small an item, a reduction of rates could not have helped the farmers, but could only have reduced the ability of the railroads promptly to move the grain to market. In 1920, when the wheat price was dropping daily, farmers had been unable to ship their grain because there was a freight car shortage. In 1924, after the railroads had recovered from the disorganization of the war, there was no car shortage as there had been in former years. Cars were ready and waiting to carry the great wheat crop and thus enable the growers to receive their money for their wheat without delay.

A careful economic study submitted to the President's Agricultural Commission early in 1925 showed conclusively that freight rates, in the period of fluctuating prices of wheat, had no relation to such fluctuations.

The Government body which regulates the railroads, the Interstate Commerce Commission, after extensive hearings, declared:

"The talk about the freight rates on farm products being responsible for, or having the slightest effect on, the condition of any part of the agricultural industry, is a colossal exhibit of unsoundness and insincerity. We should say what the well-informed know that they have not the slightest effect on the prices the farmer receives for his products. Haul them for nothing and he would not be a bit better off."

Thus unbiased authorities, with all the facts before them, have declared that the real interest of the farmer and of everyone else concerned lies in maintaining the ability of the railroad promptly to move the crop.

Moreover, the findings of these expert authorities served again to emphasize the important fact that such intricate economic problems as the establishment of detailed railroad rates cannot be so equitably solved by Congress itself as by the official body created by it for that purpose.

It was common acceptance of this fact and the public desire for complete justice both to the shipper and the carrier that led originally to the creation of the Interstate Commerce Commission. Therefore, the principle had long been generally recognized that if the balance of justice were tilted to the special advantage of one part of the community, either through political pressure or otherwise, such action would not only work to the detriment of other parts, but in the end would be injurious even to the part thus favored.

With the passing of this discussion there has come about some real progress in the solution of mutual problems. To an increasing degree it has become possible for shippers and railroads to see eye to eye and to work together with a single desire to eliminate waste, especially that caused by those twin evils: the shortage of greatly needed cars at some points, and the mutual understanding there was a happy adjustment between seasonal and

non-seasonal schedules and the wheat farmer who previously had suffered when car shortage prevented his shipping grain to market, now found cars waiting on the siding when he needed them.

Meanwhile, the railroads were enabled to render a greatly increased service. Money flowed more promptly from the markets to the farmers and back again into the channels of industry and commerce. Through voluntary co-operation and intelligent system the great economic machine began to run smoothly once more.

Chapter Eight

PURER AND CHEAPER FLOUR

The hard yellow wheat kernels that flow in a stream from the threshing machines are packed full of nourishment and energy but not yet are they ready for the table. First they must be unlocked and their food contents made available.

Have you ever eaten a grain of raw wheat? You have popped it into your mouth and your tongue has promptly moved it into position between your upper and lower molar teeth. Your "molars"—why, that word was derived from the Latin *mola*, meaning a mill. Therefore, the grain of wheat has literally "gone to mill"—to the first of all mills—and when the grinding teeth have crushed its shell, they have performed the very purpose of all the long train of saddlestones, querns, millstones and steel rollers. We all become millers when we cut our teeth, although modern life has found a better way with regard to wheat—the way of the flour mill.

Our fathers recall how, as boys, they used to see **their** fathers haul wheat to the mill. The traditional miller was fat and jolly and was dusted from head to foot with the flour which sifted through every crack in his small, antiquated structure. Outside, the paddles of the

mill-wheel splashed in the stream. Inside, the machinery creaked and the flat-grooved stones rumbled against each other when wheat was poured into the hopper.

Today, all is changed. In most of the old grist mills the stones no longer grind, the water wheels have fallen apart and the roofs are sagging. No longer does the miller finger the grain, to take out the dirt he thus may find, throw the rest into the hopper and presently return to the waiting farmer his dark, coarse flour and his bran. The modern miller is a busy executive in the office of a great plant and bears little resemblance to his dusty predecessor. His plant is a huge building or series of buildings containing thousands or millions of bushels of wheat which runs unceasingly in many streams through countless chutes and machines, to come out at last as fine, white flour, bran and middlings.

The modern flour mill had its beginning only half a century ago, with the invention of the "purifier," followed by the substitution of steel rolls for grinding stones. Like the aid which the reaper brought to wheat farming, these innovations introduced a quickening and transforming influence in the process of milling. Before their advent, few mills in the United States were capable of producing as much as one thousand barrels of flour in a day, while today there are many single mills which are able to furnish all the flour consumed by a city of two million inhabitants.

The miller no longer grinds for the waiting farmer, but himself buys thousands or millions of bushels of wheat. The grain exchange and the bank have come in with their services to make such huge transactions possible between the modern miller and an army of farmers.

In the mill of today, the scientific laboratory plays an important part; all in-

coming grain and all outgoing flour must pass the searching examination of its chemists. They have found many wonderful things in a grain of wheat of which the old miller never dreamed. They have shown that what he thought of only as bran is a marvelous six-fold wrapping which protects thousands of cells of gluten containing starch granules in walls of cellulose, the "heart of the wheat." From these cells, the modern miller is able to produce the fine white flour which the old grist-miller was powerless to make and which the dainty housewife demands for her bread, cake or pastry baking.

Whereas wheat once went through the fingers of the miller as a dirt removing process, then into his hopper, between millstones, under blowers and through sieves, to come out as just flour and bran, the course of the grain is now more devious. Today, great rumbling machines remove the sticks, stones, straws, farm dirt, oats, corn, weeds and dust from the wheat far more completely than could human fingers. Not once but many times is the cleansing process repeated before a grain of wheat is permitted to be crushed. Separators, dust collectors, aspirators, scourers, washers and driers do their work automatically and thoroughly. Not until they are completely cleansed, do the kernels of wheat enter into the milling process proper. From this point a series of rough break rolls, break scalpings, bolters, purifiers, smooth steel rolls and more bolters and purifiers carry out the refining process.

As now constituted, milling is among the most efficient of all industries, for both grain and flour are untouched by human hand, and the swift, tremendous processes involve an astonishingly small manufacturing cost in proportion to the value of the product.

Not content with even these results,

millers individually and in association are still engaged in a busy process of research and experimentation, in order that still better flour may be made, with still less waste, and in order that the knowledge gained may be made available to the housewife and the baker.

The grain grower, too, is given the benefit of this experimentation. Millers have found that some kinds of wheat make better flour than others and that certain kinds are best adapted for certain bakery products. This information is passed on to the farmer in the convincing form of premium prices offered for grain that comes up to the standards set by the millers.

The depression in the wheat belt which brought despair to the farmer, was not without similar effects upon the milling industry. When the World War came, leading millers voluntarily limited their profits to twenty-five cents a barrel and, later, all submitted to a Government restriction of profits to that amount. Thus, they were unable to build reserves for the ensuing period of depression. Problems of readjustment to new conditions, therefore, pressed as heavily upon the men who ground the wheat as upon those who grew it.

One of the most important results of modern milling processes has been the extension of the growing of hard spring wheat. The old rough millstones could not satisfactorily grind this grain into flour, but steel rolls effectively solved the problem. To this one advance in milling may be attributed the development of the great hard spring wheat industry of our Northwest.

From the standpoint of the baker, the development of modern milling has been invaluable. Without it, the rapid growth of the baking industry would have been impossible.

(To be continued)

An Employment Committee

THE group of chemists and technologists whose interests lie chiefly in the field of milling and baking and who constitute the American Association of Cereal Chemists are developing an ambitious program for the help of their members. In addition to the Question Committee which for the past year has acted as a clearing house for all inquiries on cereal chemistry and laboratory work a committee has been organized to carry out the thought of the last convention that some means be provided by which chemists seeking employment and firms needing chemists might be brought together. A recent Association News Letter, which President R. J. Clark says is but the first of a series which will be sent out during the year, calls attention to the organization of the Employment Committee with Dr. C. B. Morison of American Institute of Baking, as Chairman. It is suggested that all chemists who wish to make new connections and all firms in need of chemists or technical help should communicate with Dr. Morison.

This committee will provide a valuable service and go far towards narrowing the gap which too often exists between the head of a firm and the technical staff on whose work must depend the important factors of quality and uniformity in products.

Continuing Campaigns

Many splendid and productive campaigns reach their height, serve their purpose and are abandoned. It is probable that some of our efforts to increase the consumption of bakers' products will endure for a while and pass away. But if they are well conceived and executed they will in most cases grow in productiveness, as they are carried through by more bakers and are better understood by consumers.

Note on Weight Losses of Bread

By C. B. MORISON and L. P. GERBER

A PREVIOUS contribution to Baking Technology has reported data on the losses in weight of wrapped and unwrapped bread for three periods of time, 24, 48 and 72 hours respectively, with special reference to the effects of various kinds of paraffined paper in reducing such losses.

It has seemed desirable to extend the period of observation further for the purpose of obtaining first hand data on the length of time required for unwrapped bread to attain approximate equilibrium with ordinary atmospheric conditions.

We have therefore determined the initial total moisture content of bread made under known conditions, and exposed samples of this bread to the atmospheric conditions of the laboratory over a period of 40 days, weighing the exposed bread at approximately 24 hour intervals.

The bread was made from a sponge and dough, containing the ordinary amounts of yeast, salt, sugar, malt extract, shortening and milk as used in commercial bread formulas. The flour was a well known brand of Northwestern Spring patent with an absorption of 58%.

For the purpose of checking the total moisture of the bread, the dough was divided into two batches termed A and B respectively, made up, proofed and baked under similar oven conditions in the form of round top loaves weighing approximately one pound.

Samples of the bread were then selected from each batch and the total moisture determined according to the method employed in our laboratory. Satisfactory agreement was obtained as follows:

Total Moisture 1 Hour After Baking

Bread A	Bread B
34.85%	34.97%

Three samples of bread from batch B, the initial weights of which were 471.0, 434.0 and 442.0 grams one hour after baking, were allowed to stand three hours in the laboratory and then weighed with the following results:

Batch B	1	2	3
Initial weights	471.0	434.0	442.0
After 3 hours	463.3	427.8	436.4
Loss gms.	7.7	6.2	5.6
Loss %	1.63	1.43	1.27

The three samples were then exposed on a shelf in the laboratory permitting free ventilation, and weighed at approximately 24 hour intervals.

The following graph shows the losses in weight of the samples of bread observed over a period of forty days, and Table I the atmospheric conditions of mean temperature and relative humidity for each day of the corresponding period.

TABLE I

Atmospheric Conditions, 40-Day Period Shown in Graph.

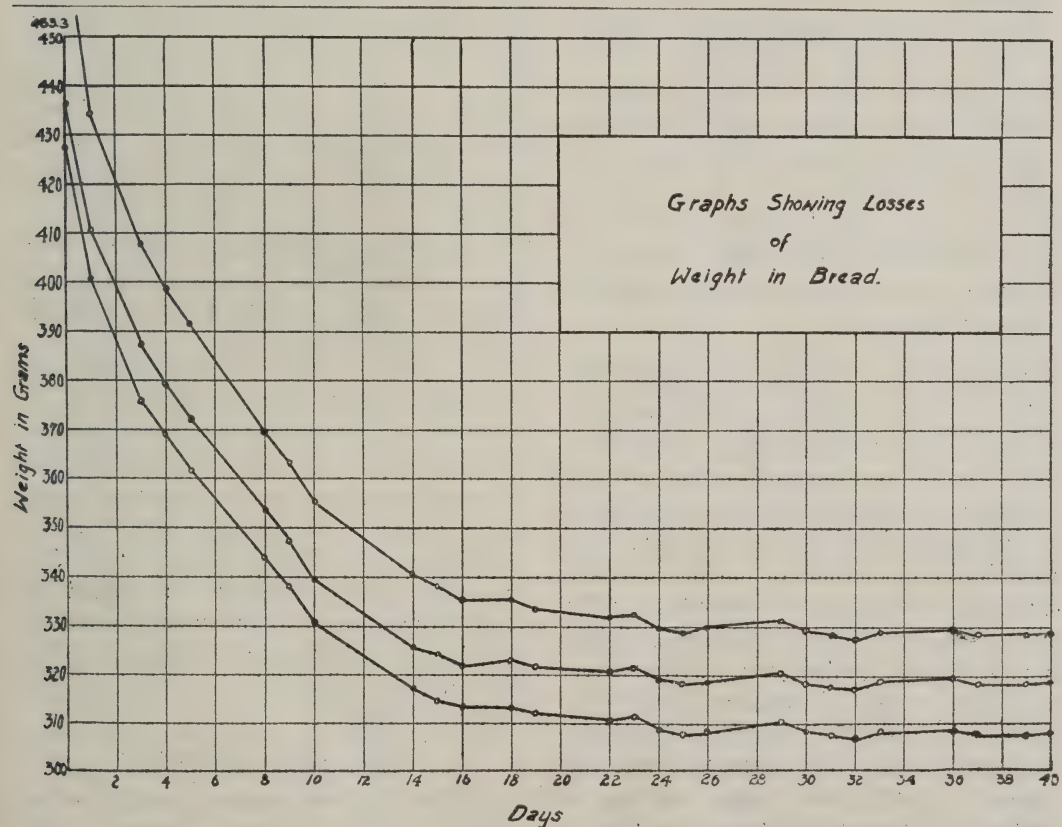
Date	Day	Relative Humidity Per Cent	Temperature Deg. F. Mean
June, 1925—			
22	1	69	72
23	2	65	64
24	3	79	62
25	4	71	62
26	5	62	67
27	6	67	64
28	7	60	64
29	8	57	62
30	9	56	62

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Date	Day	Relative Humidity Per Cent	Temperature Deg. F. Mean	Date	Day	Relative Humidity Per Cent	Temperature Deg. F. Mean
July—				July—			
1	10	45	76	17	26	58	66
2	11	66	72	18	27	61	68
3	12	56	82	19	28	50	74
4	13	71	76	20	29	70	74
5	14	55	74	21	30	49	76
6	15	52	85	22	31	66	67
7	16	83	70	23	32	60	68
8	17	79	72	24	33	40	75
9	18	79	76	25	34	54	72
10	19	53	74	26	35	77	66
11	20	59	82	27	36	65	68
12	21	69	81	28	37	63	64
13	22	51	75	29	38	48	67
14	23	61	76	30	39	66	70
15	24	51	82	31	40	71	63
16	25	57	74				



The slope of the curves begin to show a pronounced change in direction to the horizontal at 16 days, followed by slight deviations according to general atmospheric conditions. The moisture content of the bread at

the 16th day calculated from the initial moisture content and weight of the bread one hour after baking and the loss in weight for 16 days ranged from 9.2 to 11.3%.

At the sixteenth day the crust was very dry and brittle and the losses shown afterwards cannot be wholly attributed to loss of water vapor, as mechanical losses from handling and weighing are unavoidable in spite of obvious precautions which were taken to reduce this error.

Maurizio has shown that fresh bread exposed to the atmosphere will dry out slowly to a moisture content of 12-14%. Bread of one to three years old has a moisture content similar to that of grain and flour.

Bread weighing 750 grams according to Maurizio dries out to the above amount of moisture in 30 to 40 days, and bread weighing 70 to 100 grams in 8 to 10 days.

Investigation of the moisture content of very old bread, such as the St. Agatha bread, thirty to fifty years old that Balland examined, showed from 11.9 to 14% moisture. Von Bibra has also reported similar results.

The Sound Science of Nutrition

Out of the miscellany which has constituted our knowledge of nutrition there is at length emerging a sound science based on thousands of studies carried on in hundreds of biological, chemical and nutritional laboratories. And this modern science is laying the foundations for the newer knowledge of nutrition which our recognized leaders are so rapidly assembling. It is the science of fact instead of guesswork, recorded by trained observers whose only motive is the discovery of truth, who have nothing to exploit and whose profit is the knowledge that they are contributing to the better nourishment of children and the better sustenance of our race.

Sugar and Sweetness

IT HAS recently been remarked that the rare sugars of the present day may be among the common sugars of the future. Such a conjecture is not entirely devoid of justifying evidence. Sucrose, as cane sugar or beet sugar, has long been available in crystalline form in a high degree of purity as an inexpensive article of commerce. At the current retail price, one cent will buy considerably more than three hundred calories of sucrose, representing the nearest approach to chemical purity of any common item in the diet of man. Only a few years ago, the much berated "glucose" was commercially available only in the form of comparatively crude syrups, but today there are indications that refined products of high purity will soon compete with the long favored sucrose under conditions that do not justify the somewhat derisive designation of "corn syrup." Lactose, or milk sugar, is marketed in large quantities. Levulose, also known as fructose, or fruit sugar, once ranked among the rarer sugars, has been produced in quantity for a number of years; and the possibility of manufacturing levulose syrup from the Jerusalem artichoke, which contains from 12 to 14 per cent of the carbohydrate inulin, has already been suggested. The production of invert sugar syrups, containing glucose and levulose, from sucrose already is an industry of considerable proportions. The changing dietary customs in regard to sugar products, is shown in the lessening prominence of honey and molasses in comparison with their role in the culinary arts a century ago.

Relative Sweetening Values

In view of these circumstances it seems highly desirable to learn the special properties with which the possible saccharine competitors for human favor are endowed so that they can be compared discrimi-

nately when occasion arises. Change is not always dictated by choice; it may be enforced by unanticipated necessity, as those who recall the sugar shortage during the World War can testify. The most prominent feature of the sugars as a class is their sweetness; yet, strangely enough, accurate information as to their relative sweetness has largely been lacking or the data have been variable. Recent studies at the University of Minnesota are probably the most satisfactory contribution yet offered on the subject. If the sweetness of sucrose is rated as 100, levulose deserves a value of 173, glucose 74, maltose 32, galactose 32, and lactose (milk sugar) 16. The low sweetening power of the latter has long been known, and has made it possible to use this easily dissolved carbohydrate in large quantities where high calory intake was desired, but ordinary sugar would become distasteful because of its greater sweetness. The unique sweetness of levulose has not been fully appreciated heretofore. It accounts for the relatively high sweetness of invert sugar produced by inversion of sucrose, thereby increasing its sweet flavor about 30 per cent. It will also come as a surprise to many that "glucose," the hydrolysis product of starch, approaches cane sugar so closely in sweetening power.

Is Pure Sugar a Menace?

The time has come for students of nutrition to emphasize the fact that the place of sugar in the dietary has changed from that of a flavoring adjuvant to a position of not negligible importance as a food fuel. A century ago the per capita consumption of sugar presumably did not exceed ten or twelve pounds yearly. At present the annual use averages a hundred pounds or more. This gradual introduction of approximately two pounds, or eight thousand calories a week, into the

regimen of the average person can have occurred only through displacement of some equivalent source of energy. Pure sugar, devoid of inorganic salts or vitamins, has thus become a diluent, so to speak, of the national diet. This does not mean that sugar is not a wholesome food; on the contrary, it is easily digested as a rule and quickly mobilized for physiologic uses. Without sugar—in suitable form—in the blood, disaster quickly arises. But the purity of present-day sweet sugar used as a food rather than as a food adjuvant inevitably leads to a decreased intake of the useful "contaminants" that are introduced into the diet along with the cruder sources of carbohydrate or fat that is being displaced. Whether a real menace to well being is involved therein remains to be seen. A change in dietary customs and food habits has, at least, brought new problems.

—Editorial, Jr. of Am. Med. Assn.,
September 26, 1925.

Time for Action

Why need we wait longer to take to every mother of children, every father at his work, every teacher in our schools, every member of our great American family, the facts we know to be true about our products, the facts of their purity, their digestibility, their fundamental importance as the basic food both in terms of chemical composition and as the carriers of other foods into consumption? Why need we longer pause to bewail the diminishing use of cereal foods when we have so many reasons to proclaim the need for increasing their use and such powerful arguments to support our position? Now is the time for the bakers of America to demand for their products the full recognition to which they are entitled as our best and most essential foods.

BREAD

AS THE PHYSICIAN SEES IT *

By MORRIS FISHBEIN, M. D.,

Editor The Journal of the American Medical Association.

THE romance of bread is a story that has been related many times in folklore and in written history. The rhapsodist tells of the farmer going forth at dawn to sow the seed. Below the soil the kernel gathers nourishment to reproduce itself a thousand fold. The wheat lifts its stalk to the life-giving sun and rain. Men and the machines assemble for the harvest. Transportation engineers arrange for conveyance of the seed to the mill and carry the flour across the world. The house-wife in Scotland turns out her scones; in France, one sees the long loaves of French bread; in Austria, the Vienna loaf; in Poland, the twist, and in our own country, the bread "untouched by human hands." Time and again the epic of the wheat and of the soil—for the epic of the soil is always the story of wheat—has been the theme of novels such as Zola's "Mother Earth", of Knut Hamsun's "Growth of the Soil", of Remont's "The Peasants", of Herbert Quick's magnificent trilogy of Iowa and the Vandermark family, of the great story of Frank Norris, "The Pit". The story of bread carries one back constantly to the beginnings of things. In preparing the English system of weights and measures the pennyweight was represented by thirty-two grains of wheat. Indeed, so fundamental was bread to life that the term baker's dozen arose because of the strict laws laid upon bakers in the giving of proper weight, so that the careful and law-abiding members of the trade threw in an extra loaf to assure the cus-

tomers that he was receiving adequate measure.

Now there was a time when a loaf of bread in these United States was just about as standard an item as a cubist painting. In those days a loaf of bread looked like bread and perhaps served its purpose satisfactorily as a vehicle for butter or jam, but so far as its content, its texture, and its digestibility were concerned, it was best expressed by the letter "X", representing the unknown quantity. Indeed, young ladies became especially famed for their ability to turn out a specimen that would receive the approbation of the community and many a damsel hung a blue ribbon received at the county fair as exhibit A in the parlor to attract prospective marital candidates in her direction. Many a pseudo-humorist waxed wealthy on the jokes he made concerning the product turned out by newly-weds. And since those were the days before beauty shops were as plentiful as candy stores many a young lady lacking comeliness qualified for the marriage route by her culinary capacity, with special emphasis on what she could do with flour rather than with powder. Those days, fortunately, are gone forever. Today a loaf of bread is as standard an item as the money that purchases it. The money must look and feel and weigh the same piece for piece; its ingredients must be always the same, and it must yield a certain definite value. In the same way the loaf of bread must have definite weight, appearance, texture and taste, and must yield a definite food and body

*An address given before American Bakers Association, Buffalo, N. Y., September 17, 1925.

building value. To the physician who has to count on bread as an article in the diet of sick and well, it means much to know there is a standard.

The Value of Food

The scientific study of food has followed certain definite trends. As early as 1840 it was recognized that proteins, fats, carbohydrates, mineral matter and water were the components of food tissues. Continuously thereafter chemists were investigating constituents of food substances, and by 1895 Atwater and his associates in this country had examined and listed the chemical composition of most common foods. About this time also it became common to classify food substances wholly by their caloric value or the amount of energy that they would yield to the body when taken in and properly digested. The next two decades added to this fundamental knowledge observations concerning those mysterious substances known as the vitamins, so that McCollum and Davis were able in 1915 to formulate a theory of adequate diet. At that time they said that a diet must contain in addition to proteins, carbohydrates and fats for energy, inorganic salts for the building of the body and vitamins A and B necessary for proper growth and development. Later additional vitamins became known, so that the alphabetical category includes A, B, C and D quite definitely established, and possibly vitamin X or E necessary for reproduction. When considering the value of any food today we take into account all of these various factors, and, as is obvious to almost anyone with a fundamental knowledge of foods, no single substance provides all of the necessary elements for adequate nutrition. Milk is, no doubt, the most satisfactory single article of food consumed by man, but even milk is not a complete food

when taken over a long period of time as the sole source of nutriment. One of the troubles with milk is that too much bulk is required to satisfy the body's needs. It contains 87 per cent of water and 13 per cent of dissolved substances; it happens to be rich in both calcium and phosphorus, whereas many vegetable foods are rather poor in these elements. Indeed, only the milk of animals and the leafy vegetables contain enough calcium to satisfy the needs of man. The element calcium is a most important substance for the human body is sensitive to changes in the amount of calcium in the circulating blood. Quite recently Collip, co-worker with Banting in the discovery of insulin, has found that the amount of calcium in the blood may be controlled by an extract made from the parathyroid glands, which lie behind the thyroid gland in the throat. Experimenting with this substance he has been able to produce remarkable changes in the body activity, merely by lowering or increasing the amount of calcium in the blood. Milk supplies not only calcium, but also certain proteins, fats and vitamins.

Wheat, and indeed all the cereal grains, seed substances, potatoes, roots and muscle meats lack the constituents that are supplied by milk and the leafy vegetables. The human being is supposed to be intelligent. It has been alleged that the large majority of us are morons and our dietary habits may be taken as evidence for the allegation. A moron, I may add, lest you take the newspaper definition, is an adult whose intellectual development stopped at the age of twelve. There is no law of man or of nature that compels the thinking human being to limit himself to milk, wheat, oranges, nuts or anything else in the food category. If he is really intelligent he will want to make up his diet of a sufficient

variety of foods to provide everything necessary for the proper development and stability of his tissues. He will want to satisfy the esthetics of his appetite and the limitations of his digestive apparatus. Investigations have shown that fresh fruits and certain raw vegetables ought to be included in the diet to provide adequate amounts of vitamin C. Scientific studies have shown that the proteins of the muscle of the liver and kidneys are more valuable as a supplement to cereals and fats than are the proteins of milk. Indeed, it is not even certain that milk provides an adequate amount of vitamin B, and it is known that various samples of milk differ as to their quantities of vitamins A and C. Eggs contain everything necessary for the growth and maintenance of the body but are poor in calcium and unbalanced in other food principles. On the other hand, oysters, clams and crabs contain all of the uncharacterized food substances, including iodine and vitamin C. The fact that vitamin D is present in fish oil suggests an importance for fish in the diet that has not been previously thought of. Vitamin D, it must be remembered, is a help to proper reproduction and to the avoidance of sterility. Finally, all of the natural, primary food substances, such as milk, butter, fish and what-not are not themselves standardized, but vary according to their place of production and their environment previous to use. This hasty review of the elemental values of some of the well known food substances is indicative of the importance of a varied diet for man. Let us see how bread, as one of the fundamental and staple substances of human diet, has been gradually modified through scientific education and control to develop as nearly as possible a standard, highly nutritious and body building substance.

The Value of Bread

As was intimated in opening this discussion, the bread of the past epoch had no definite constituents. It was made in many instances from flour, salt, yeast and water alone. In other instances it was made of the whole wheat and there were, of course, such modifications as bread made with rye, bread made with bran, bread made with raisins and other added constituents. The baker, from the mechanical point of view alone, is not particularly desirous of preparing any special form of bread. He likes to give his customers what they want, and perhaps to approach as nearly as possible what dietary experts think they ought to have. No doubt, like all other business men, he wants to deal in a staple product and not be subject to extensive losses by the sudden growth of elemental and unjustifiable fads. It was, no doubt, with this desire in mind that the bakers' organization established its Institute of Baking, and it was, no doubt, the same principles that urged many bakers of large interests to establish their own chemical laboratories for the study and standardization of their products. The result has been an application to modern bread of the scientific facts that have been learned relative to diet. This application caused the supplementing with milk of the bread made from white flour, salt, yeast and water. The addition of milk directly to the bread rather than dependence on the house-wife to give milk to the family at the table is well-warranted, because economical and scientifically satisfactory. This does not mean to say, however, that the milk added to bread is sufficient for all dietary needs; it merely means that a bread made with milk is a better and richer bread than one made without it. In the same way a bread made with raisins or other fruits

provides the added constituents of those fruits. All breads furnish energy according to their composition. Modern bread having a scientifically established composition is a sensible food. It contains about 45 per cent starch and 50 per cent total carbohydrates and its protein content averages between 9 and 10 per cent. It provides limited amounts of mineral salts, of fats and of the vitamins, but it should be remembered that wheat products provide 42 per cent of the carbohydrate consumption of the United States and 26 per cent of the total calories consumed in all food substances. As may well be imagined, a loaf of bread may vary greatly according to the quantity and the nature of the constituents that go into it. A bread made with white flour, yeast, salt, malt extract, sugar, shortening and water will not have the food value of a bread made of the same constituents with the addition of the amount of milk required by modern baking standards. Our Government permits the title, "Milk Bread," if one-third of the liquid used in making the bread is milk. A bread made with five pounds of sweetened condensed milk per cental of flour contains about one and a half ounces of milk to a pound of bread. Bread may be made of whole wheat and other elements of roughage and of vitamin supply that are lacking in bread made from white flour, and it is possible to prepare bread with wheat germ added to such an extent as to provide twelve times the amount of wheat germ contained in whole wheat bread. But such breads are open to certain objections so far as texture and keeping qualities are concerned. The physician who is prescribing bread as a part of the patient's diet must know the constituents and character of the bread that he prescribes. Indeed, the situation today resembles closely the situation that

existed in the drug industry before the American Medical Association appointed its Council on Pharmacy and Chemistry, and before the Food and Drugs Act of a little more than a decade past helped to clarify the situation. Today through the Council on Pharmacy and Chemistry, physicians are provided each year with a book known as "New and Nonofficial Remedies," which gives the analyses, actions and uses of all of the unofficial drug products available to the medical profession. At the same time the Council regularly issues reports concerning such products as are of indefinite composition or for which claims may be made that are not warranted by the actual constituents of the drug preparations. The variety of products offered from time to time by baking organizations that seem to be more concerned with profits than with public health offers opportunity for similar work in the baking industry to keep both the baker and the public informed of the actual basis on which exploiting of nostrum-like products is based. The Institute of Baking has done, and is doing, much in this direction.

Bread for Reducing

Not long since a baking organization issued, with extensive claims, a bread which bore the slogan "The Enemy of Fat." Letters at once began to come to the American Medical Association headquarters requesting information concerning this product and its actual importance as a part of the diet of those desiring to reduce. In attempting to reply to these questions, The Journal of the American Medical Association sought information from the American Institute of Baking and from the Westfield Testing and Research Laboratories. The information revealed that the bread advertised as an "Enemy of Fat" contained from 29 to 33 per cent of starch and a total carbo-

hydrate content of from 36 to 40 per cent whereas ordinary bread contained only some 45 per cent of starch and 50 per cent of total carbohydrates. Moreover, the bread for the fat contained 18 per cent of protein as compared with 9 and 10 per cent in ordinary bread. Clearly from these analyses the bread mentioned had no special value in a diet for those desiring to reduce. Any women who would eat a smaller amount of ordinary white bread or the same amount of ordinary whole wheat bread and who would follow the rigid diet recommended in each package of the bread with special claims as to value in obesity would be able to reduce just as rapidly and at less expense. These observations caused the Institute of Baking to make the statement that the claims made for weight-reducing breads were misleading and exaggerated. The Journal of the American Medical Association supported the Baking Institute with all its force of influence and publicity in its exposure of this quackery.

The All or Nothing Policy

The tendency to attach undue virtues or evils to single factors in the diet has been responsible for much fallacious teaching in public health. Of all of the faddists that occupy the medical scene the food faddists are, no doubt, most eccentric. The vegetarians, who attach undue evils to the eating of meat, base their conclusions on the fact that the anthropoid apes live on nuts, fruits and cereals. The same faddists are likely, nevertheless, to deprecate the facts supporting the theory of evolution and if they do not, "How," asks McCollum, "do they explain the meat diet of the caveman?" The same faddists cite the fact that animals living on a vegetable diet are strong and tractable, while carnivorous animals are ferocious. Who, however, would care to support the contention that the mind

of man is governed by the chemical nature of what he eats. It has been known for years that the sufferer from indigestion and the man irritated by chronic attacks of gall bladder inflammation or appendicitis is likely to be irritable, cynical and a generally unsatisfactory cuss, but it has also been known that many of our greatest humorists and many of our finest leaders have been men who abused tobacco and alcohol and who gorged themselves with food. There is something more to temperament than the eating of steak or oats. All the old aphorisms such as, "Tell me what you eat and I will tell you what you are", were based more on superstition than on the science of nutrition. Actually there is no conclusive evidence to support any view as to the dangers of eating wholesome quantities of any single article of diet, such as meat, bread, wheat, or any other of the fundamental substances. However, it is quite customary for the faddists to concentrate their attention on the exploitation or condemnation of some single substance. One of the chief shuttlecocks with which they have amused themselves is the controversy as to the value of white flour as contrasted with whole wheat flour bread.

Whole Wheat Bread

The very fact that wheat and bread are fundamental substances in the diet of man has made the exploitation of cereal products and of bread an attractive field for the exploiter. This, too, has influenced the manufacture of numerous whole wheat products, for which claims are made that go far beyond the scientific facts. Indeed, the false and fulsome advertising has been so potent that even a circular just issued by the Children's Bureau of the United States Government advises the pregnant woman and

the nursing mother to limit their diet of bread and cereals to whole grain because of the high mineral and vitamin content.

Let us consider first the manner in which it has been endeavored to relate the consumption of white flour to the cause of cancer. It is a significant observation in medical history that the advancing of numerous and peculiar theories is a good indication of the lack of any accurate knowledge as to the cause of disease, just as a multiplicity of methods of treatment is a reflection of a similar state of affairs. Fortunately sufficient is known about cancer to warrant the advice that it be treated primarily by early diagnosis and surgical removal, with possible application of radium or X-ray for such purposes as may be accomplished with these methods. The world was surprised not long since by the announcement of the discovery of a new bacterial organism as the cause of cancer. For the past fifteen years the discovery of some bacterial organism associated with cancer has been an annual event. During that same period hardly a month has passed by in which the editor of *The Journal of the American Medical Association* has not had submitted to him manuscripts advancing new theories as to the cause of this malignant condition, and not the least among these theories have been those associated with dietary fallacies. In England the exploiters of this peculiar idea have been such men as the surgeon, Arbuthnot Lane, and the publicist, J. E. Barker. Indeed, even Sir Clifford Allbut before his death was drawn into the controversy in the support of whole wheat bread as contrasted with that made from white flour. It was Sir Clifford Allbut's view that the whole wheat flour was richer, that it had a more agreeable flavor than the white loaf, which he said was insipid, and that the vitamins are illusive and must be

sought in the whole grain. Once this view was advanced, others came to its support and medical health officers and general practitioners did not hesitate to advance their opinions. Arbuthnot Lane committed himself some years ago to the view that most of the ills of mankind are caused by intestinal stasis or constipation. He urged the use of whole wheat bread to relieve constipation and he short-circuited the intestines and removed their kinks as a quick surgical road to the relief sought. It was a witty American surgeon who commented: "It's a long lane that has no kink."

As might have been expected, it was not long before the British hyperenthusiasm infected the United States. Among the first to seize upon this conception for journalistic exploitation was the organ of that most erudite of automobile manufacturers, Mr. Henry Ford. The man who found difficulty in distinguishing between Benedict Arnold and Arnold Bennett, did not hesitate, through the periodical that he sponsors, to support the view that the eating of white-flour bread is responsible for cancer. There was about as much actual knowledge behind the latter opinion as behind the former. There is not an iota of scientific evidence that the eating of white bread, or any other kind of bread, will cause cancer, and not the slightest reason to believe that the use of whole wheat bread will in any way prevent it.

White Flour Bread

Before making a definite statement as to the actual value of white flour bread as contrasted with whole wheat, it should be emphasized again that neither white flour bread nor whole wheat bread constitutes a single article in the diet for any intelligent person. As pointed out by McCollum, there are many reasons why the Americans eat white flour bread satis-

factorily. "White flour," he says "keeps much better than whole wheat flour and so can be handled with less commercial hazard. The American public likes white flour bread, and I do not see any reason," he continues, "why this taste should be disturbed. The important thing is to insist upon the consumption of a sufficient amount of what I have termed the protective foods—milk and vegetables of the leafy type—to insure that calcium deficiency and the vitamin deficiency of white bread will be made good." If baking technologic research is able to incorporate larger amounts of milk solids in the loaf of bread or otherwise to insure a sufficient amount of calcium and the important vitamins, even this charge cannot rest against white flour bread.

The supporters of whole wheat as against white flour for dietary purposes argue that the human bowel requires a certain amount of roughage in order to exercise its functions satisfactorily. This point must not be considered without reference to the varying conditions that may exist in different individuals. Dr. W. C. Alvarez of the Hooper Foundation for Medical Research has vigorously attacked the unguarded and unqualified recommendation of coarse food substances. "Some men and women can be greatly helped by bran," he says, "and their constipation can be cured if they happen to have the digestion of an ostrich; but if they happen to have congenitally defective or handicapped digestive tracts; if they have ulcers or narrow places, they cannot handle the mass of indigestible material and they promptly get into trouble." Many other dietary substances such as celery, lettuce, spinach and raisins provide roughage. Why ask bread to be, like Messalina, all things to all men? It is for the individual physician, knowing the condition of the intestinal tract of the person with whom

he is especially concerned to determine whether or not that person ought to use breads or other foods that depart from the standard product or from the normal diet. For those who do not have such special recommendation, the standard white bread loaf that forms the large portion of bread baked in the United States today, is the product to be recommended as most satisfactory.

Fads and Faddists

We are a people singularly cursed with faddists. We have educational cults, healing cults, religious cults, and heaven alone knows how many peculiar promotional systems. We have dietary faddists who believe that the eating of more white bread, more wheat, more fruit, or more raisins is necessary to healthful living. The time has arrived for calling a halt to the growing procession of slogans that tend to promote panaceas for health and well being. We are admonished at every turn to eat more bread, to drink more milk, to buy more raisins, to consume more apples, to confine ourselves to whole wheat, to try some bran, or to add one or another of a dozen different items to our daily regimen. Many persons have a limited tolerance for a food like raisins and the victim of chronic inflammation of the intestines may hesitate to secure his iron through a "mixture of sugar and skins" as one caustic commentator characterized this confection.

The starchy foods, wheat, corn, rice and potatoes are universal sources of food for the body. Bread, the very staff of life, gives that feeling of satisfaction following eating that is an important factor in a suitable diet. One should not urge the sedentary, the desk-ridden, or any other muscularly inactive person to eat more meat or more wheat or to increase his bread supply. Americans today tend more and more to suffer with obesity or overweight. It is the opinion of those

best informed that overweight is one of the most important factors in shortening the span of human life. Physiologists have established the fact that a meal composed largely of cereals is passed through the stomach within one and a half hours, whereas the inclusion of meat will prolong the time two or three hours. In recommending a diet of cereals and starchy foods as compared with meats, fats and cheese, these things must be taken into account by the physician.

Conclusion

The scientific physician welcomes the establishment of a standard loaf of bread made according to the best scientific evidence as to what is demanded in bread by the taste of the public, by our knowledge of nutrition and of the mysterious vitamins. Such a product can be included in diets both for the sick and for the well with a clear understanding of the effect that it may have on digestion and growth. The physician opposes the promotion of any single article of diet according to "the all or nothing policy" as the one substance important to health or the control of disease. In efforts at education of the public, which the modern physician believes is the most important factor in lengthening the span of life, faddist notions must be attacked with all the vigor and influence that the scientific pen can command either by purchase of advertising space or by the contribution of articles published for the public good. The baking industry of this country, in its scientific study of bread and bread making, and in its promotion of such ideals, may be assured of medical support. The time is near at hand when the compliment given by Don Quixote to a Knight of his acquaintance may be used without fear of attack from any meticulous critic. The Don remarked to his squire Sancho Panzo: "He is as good as good bread."

Home Baking Deplored

ONE of the features of the Paris Exposition of 1900 was a bread making exhibit.

Dr. H. W. Wiley, then Chief of the Bureau of Chemistry, was the leading food authority of those days and the representative of the United States at the Exposition. The Forum of November, 1900, contained an interesting article by him entitled, "Bread Making of the Paris Exposition." Its concluding paragraph, written as it was, twenty-five years ago, was prophetic.

"The domestic baking of bread is to be deplored. Bread making is as much of an art as tailoring; and we have as much right to bread made by experts as we have to coats and gowns fashioned by tailors. In fact, a ready-made suit keeps you warm even if its fit is not faultless. But bread badly made has not a leg on which to stand. An earnest effort should be made to relegate domestic bread making to the past and to institute in every community bakeries under competent control offering the best bread at the lowest prices."

Less Bread, Poorer Fed

Is it not possible that the baker of bread has himself fallen into error in thinking that the public taste which has demanded less and less bread during the past few decades is as well fed with less bread as it would be if the old-time heavy bread ration were again called for?

Has not, perhaps, the public drifted into easy and expensive ways of meeting its nutritional needs through a constantly widening variety of attractive, palatable and interesting foods without realizing that when it strays far away from its basic food it invites disaster and imperils the generations that come after it?

Standards for Pie Fruits

Canners and Bakers Are Working out Standards which Will Improve Pie Quality

By W. P. HARTMAN*

BETWEEN the baker and the canner there is a bond of kinship. We have much in common in our problems of production and merchandising. Our finished products become your raw materials.

The canner of fruits and vegetables is striving constantly to improve the quality of his pack just as you leaders in your industry have as your goal the building of a better pie.

During recent years practically every industry has set up standards to govern production of the finished product. This has been especially true in the manufacture of food stuffs. The canners through their national organization, state legislation, in co-operation among themselves, and with others, have set standards which are a growing credit to the industry and a safe-guard and guarantee to the consuming public. The canner of today who attempts the packing of inferior raw materials, or who operates under insanitary conditions or practices short weight is a predestined failure just as the pie baker who may continue to fill the space between the crusts with cheap, worthless, sometimes harmful so-called "fillers."

A can of cherries or other fruit should mean sound fresh fruit harvested at the proper time in its maturity and handled with dispatch from the tree to the factory and into the containers and the cans filled with fruit and not water, or fruit juice, and by the same token Cherry Pie should be made of cherries and not a

gelatinous mass of juice, corn starch and now and then a cherry.

The program of standardization with the progressive canner begins with the planting of the seed, tree and bush. It is a vital part of his production program to know the varieties, and even the strains of given varieties, of fruits and vegetables best adapted for canning purposes.

To most folks a pumpkin is a pumpkin, a cherry is either sweet or sour, red, black or white and apples are either quartered or sliced, solid or in water, but to the canner each variety is known for its merit or lack thereof in the tin. Therefore, the canner must control the variety as well as the condition of products delivered at his receiving platform.

In catering to your specifications for canned fruits and such vegetables as are used in your plants, the alert canner is constantly analyzing your requirements in order that he may give you products that will hold up, retained original flavor and color, and packed so as to deliver the net contents through avenues of distribution to your receiving department at the lowest possible unit cost. In other words, a dependable quality product and of firm, honest pack.

The program of standardizing canned food products is by no means entirely complete. On the contrary an active standing committee of the National Canners Association works in close touch with the Committee on Definitions and Standards of the U. S. Bureau of Chemistry, state food officials and others, building new and revising old standards. It is assumed that

*An address given before the National Association of Wholesale Pie Bakers at Buffalo, September 16, 1925.

the pie baker does not want to pay the price for extra selected large raspberries or other fruit, put up in heavy sirup, when medium sized fruit properly matured, sorted and handled and packed firm in natural juice, or water just sufficient for proper processing, will serve your requirements in every essential equally as well.

The canning or making of pies from fruits that are immature, decomposed, unwashed or of inferior quality from any cause should be condemned openly and vigorously and such violations of common decency as well as municipal, state and federal food laws, should be brought to the attention of the proper authorities.

The manufacturer and the purveyor of food stuffs has a double responsibility to the consuming public. The products of our factories and your bakeries feed the nation. The health and the very lives of the millions who purchase and consume our products is dependent upon the quality of our raw materials, the technic in production and the cleanliness in handling through the departments of production and distribution.

If 40% of the house wives today are still baking bread and pies in their homes, this in itself should indicate that there is still much to be done in the way of quality production and intelligent advertising to foster confidence among the wives and mothers of the country.

We canners need no argument to convince us that consumption of our products in the home and public eating places can, must, and will be materially increased from year to year. Looking forward to this increased volume and recognizing that it must be born first of confidence, the leading canners of the country years ago caused legislation to be enacted in various states which placed the canners under license, under rigid inspection and

prescribed sanitary and other conditions that must obtain in the canning of food products.

The baking of pies that will command repeat orders is at once a science and an art; so also is the conservation in tin, of the products of the garden, field and orchard.

Commercial canning in this country dates back close to a century, yet in the past ten years more progress has been made in factory operations and in improving the quality of the finished product than throughout the history of the industry previous to that time. It is no hazard to predict that still greater progress is immediately ahead. The folks at the home table, the tradesman at the lunch counter and the diner in the restaurant will demand more of our products in proportion to the confidence we create among them.

Quackery?

"Quackery is now applied to the exploitation and marketing of food products. As an evidence of it, note the advertising of Whole Grain Wheat and the exaggerated, misleading statements made concerning the value of Whole Grain Wheat as a part of the dietary in the treatment of a large variety of diseases. Fortunately the Journal of the A. M. A., Hygeia, and some of the advertising clubs that stand for truthful advertising are condemning the methods employed and the propaganda used in exploiting certain food products which though perhaps possessing certain value are not to be depended upon to the extent claimed in either the promotion or the restoring of health."

—Jour. Ind. State Med. Assn.

"The best smell is bread, the best savour salt, the best love that of children."

Books for the Baking Laboratory

VITAMINS IN DIET AND HEALTH. Pamphlet of 37 pages. By R. M. Allen. Printed by Vitamin Food Co., Inc., New York.

The food industries are studying their products today as they have never studied them before. They have adopted methods of manufacture and handling which eliminate adulteration and waste. But the character of food advertising has changed even more rapidly than the quality of the products and today methods of selling which depend for their "pulling power" on the use of destructive comparative charts and tables are rarely found.

Rather food manufacturers depend on the telling of basic food facts to stimulate the use of their products. When the vitamins were first discovered and their importance in nutrition emphasized by the dietetic experts a flood of vitamin preparations came down on the food markets. Most of these products were worthless nostrums. They contained but few vitamins and their only effect was to upset the mind of consumers and discredit the whole subject of vitamins in relation to nutrition and health.

Today the public realizes the necessity for vitamins in the diet and is selecting its rations in an endeavor to secure the essential elements in an adequate and acceptable form and amount.

One of the best contributions to the whole subject of vitamins is the booklet prepared by R. M. Allen and called *Vitamins in Diet and Health*. While the author is interested in the manufacture of a vitamin potent food and has collected his data with a view to stimulating interest in his product he has carefully avoided the usual errors of the propagandist and builds his arguments through the use of authoritative reports from recognized scientists.

He has studied the various staple foods in relation to their vitamin content and shown the deficiencies which must be repaired by the use of milk or selected vitamin rich foods. He points out the need for an increased use of the leafy vegetables and for saving the skim milk products from the creamery and cheese factory. And he stresses the importance of the yeast plant as the most potent producer of vitamin B, and shows how yeast can be grown on the waste products of the flour mills, the coarser portions of grain which are not acceptable as human food, and by concentration made available for use as adjuvants to our dietary.

The author well emphasizes the fact that the

modern idea of nutrition is concerned with something more than the supplying of enough food to support life and that in human nutrition as in animal feeding we must select foods which will develop the highest type of life and produce a race which will function more efficiently than in the older ages of man. "We can," he says, "with food facts now at hand, feed children, men and women for better growth and health, greater energy and longer life." If this much-to-be-desired end can be attained by the use of selected diets which add to the basic rations of bread and meat the essential vitamin contents such data as that tabulated in *Vitamins in Diet and Health* will be interesting and helpful.

OUTDOOR ADVERTISING. By Wilmot Lippincott. McGraw-Hill Book Company, New York, 340 pages, illustrated with 103 photographs.

Outdoor Advertising is the only book of its kind, written for and about outdoor advertising. The rapid growth of outdoor advertising in the last few years, and the ease with which this medium lends itself to sales appeal in foods makes it of interest to bakery sales and advertising managers.

The preface, by Percival White, defends the case for billboards and illustrates the manner in which the dilapidated daubs of former years have been transformed into beautiful settings for the work of artists. The earlier sentiment against unsightly examples of outdoor display, fostered by the pained surprise of our foreign visitors, has given way to our appreciation for the art in exaggerated size which more often than not becomes a screen for unsightly spots in our urban districts. "Outdoor advertising, as it exists today, is a modern development to meet the need for a medium to reach people whose attention must be caught while they are almost literally on the run. And it is a form so flexible that it can serve the corner grocer no less than the national distributor."

To the advertising man, the term "outdoor advertising" means more than billboards; it includes posters of all sizes as car cards, window cards, tacked cards, painted bulletin, walls, and signs, electrical display signs and window dressings. The twelve features which are said to characterize the best type of modern outdoor advertising are: position, size, color, dignity, instantaneous impression, circulation, repetition, permanence, dealer attitude, organization and economy.

Abstracts of Technical Articles

Selected for Baking Technology from Chemical Abstracts

Growth and reproduction of rats on whole milk as the sole diet. L. S. Palmer and C. Kennedy. *Proc. Soc. Experimental Biol. Med.* 20, 506-8 (1923).—Three male albino rats were raised from weaning to full size at maturity on a diet of fresh raw liquid milk and distilled H_2O containing I_2 ; these rats exhibited no mating instinct. A second series, representing 5 of each sex, grew normally for 50-70 days but did not attain the expected size at maturity. The females did not reproduce. Three female rats were reared to partial maturity on a mixed diet; after littering once, they were placed on the raw milk diet; subsequent litters were unhealthy.

C. V. B.

Maintenance values for the proteins of milk, bread and milk, meat and soy bean curd in human nutrition. M. S. Rose, G. Macleod and B. Bisbey. *Proc. Soc. Exptl. Biol. Med.* 21, 143-4 (1923).—Two healthy women were given a basal diet of arrowroot starch, dextrimaltose, lactose, butter fat and apple. To this was added the particular food under investigation. Each received 40 calories and 0.77-0.80 g. of N_2 per kilogram of body weight per day, for a period of 12-15 days. On the basis of N_2 balance the relative efficiency of the foodstuffs, expressed as protein storage in 12 days, is soy bean 2.12, meat 4.33, milk 41.44, bread and milk 30.37 grams.

C. V. B.

Chemistry applied to food manufacture. F. Peter Dengler and E. R. Barnes. *Am. Food Jr.* 20, 149-50 (1925).

J. A. Kennedy.

Detection of benzoyl peroxide in flour, dough, dough products, and the so-called baking aids and flour-improving agents. S. Rothenfusser. *Chem. Ztg.* 49, 285-7 (1925).— $(BzO)_2$ is permitted to be mixed with flour to the extent of 0.005% by law (Germany). As a bleaching agent it is sold, mixed with 3 parts Ca acid phosphate under the name of 'Novadelox'. To prepare a reagent for detecting $(BzO)_2$, rub up in a mortar 1 gram para $(H_2NC_6H_4)_2NH \cdot H_2SO_4$ with 96% EtOH, wash into a flask, make up to 100 cc. with EtOH and reflux on the H_2O bath $\frac{1}{2}$ hour. By this procedure a part of the difficultly soluble amine is dissolved and any traces of Et_2O_2 or $EtHO_2$ are decomposed. A pale green

color sometimes produced by atmospheric O , disappears also at this time. On cooling, some fine crystals separate out. Before use the flask is shaken and the settled crystals are evenly distributed. To a sample of flour in a test tube add some petroleum ether, mix well, add the reagent and again mix. If more than 1:10,000 $(BzO)_2$ is present a green-blue color develops immediately. If 1:20,000 $(BzO)_2$ is present the color appears within a few minutes. In weakly alkaline solutions the color is red. Large quantities of acid (organic or inorganic) make the test less delicate. Baked products should be disintegrated with a glass rod after the petroleum ether is added and before the test. Another method for testing flour is to fold a lignin-free filter paper in half. Wet evenly with the reagent and spread flour over one-half of the paper. Fold the other half over the flour and press with a glass plate. If powdered benzoyl peroxide has been added to the flour blue-green dots of indamine will appear on the moist paper. If a solution of benzoyl peroxide has been sprayed into the flour and perfectly distributed, a diffused coloration will appear. If so-called flour-improving or baking-aid powders are present to the extent of 10% in the flour intense blue-green dots appear.

H. W. Vahlteich.

Digestibility of baked goods made from patent flour. Harry J. Deuel. *J. Home Econ.* 15, 699-701 (1923).—Digestion experiments with baked goods of various sorts made with patent flour show a high coefficient of digestibility for protein and carbohydrate in all cases except pie crust, which showed a coefficient of only 76.9% for protein, probably due to the fact that the protein intake was low in this case. No digestive disturbances were reported.

L. D. Elliott.

Yeast bread compared with baking powder bread in nutritive value. Lelah V. Gault. *J. Home Econ.* 15, 689-96 (1923).—Yeast bread made from whole wheat nourished rats more effectively than whole-wheat bread made with baking powder, probably because the vitamin B and the protein of the bread were supplemented by the yeast. Six cakes of yeast per loaf made more palatable bread and nourished much better than a half cake. Yeast is a nutrient constituent of bread and any increase in the amount, up to quantities in excess of those ordinarily used will improve the food value of the product.

L. D. Elliott.

An Investment in Life

*How American Bread, Through the Splendid Work of the Near East Relief,
Is Saving Precious Lives*

A YEAR ago when we invested in life for orphan children, and co-operated with the Near East Relief in saving three hundred thousand child lives with American food, we did so without a very clear conception as to whether this investment was made in Nazareth, Smyrna, Constantinople or elsewhere. Today it was our privilege to see little Zadi, our first dividend on our investment.

Today nearly a thousand representatives of every industrial and social association in Chicago sat together at a luncheon and listened to reports by men and women who have just returned from an observation tour through the orphanages and training schools maintained by the Near East Relief. Governor Frank O. Lowden was master of ceremonies.

This movement is world wide and is too comprehensive to discuss in any short article, but today, Zadi, a little child, went straight to the hearts of every listener with the baker's story in a few words.

Two years ago this little girl was found beside her dying mother on the road leading to Amarat, diseased, covered with sores, starving, a helpless and unwanted victim of oppression. Her father had already been massacred and her mother lay dying; she was picked up out of the ditch by a nurse from the Near East Relief organization, taken to their nearest orphanage, and fed with generous quantities of American bread and milk which meant life to her. Completely cured of disease, returned to radiant health, dressed and clean she was later adopted by an American mother and brought to Chicago.

After the luncheon and sitting cross-legged on a cleared-away luncheon table,

in a sweet childish voice and in perfect English she told me how the children come to their meals in those refugee homes. In her own words: "They stretch a long cloth on the floor. They put a dish of food and a piece of bread on it for every child. The children come marching in slowly and each one stands beside their plate. Then they sing their grace." With her hands clasped and in a soft voice so as not to disturb the group standing near us she repeated their little song of thanks: "Thou art great, thou art good and we thank thee for this food. By thy hand must we be fed, give us Lord, our daily bread. Amen."

Nearly three hundred thousand of these orphan children are now being brought back to strength and health with bread, milk, meats, and syrup, all of which comes from American investment in these little lives. Bread to them is the symbol of life, happiness and liberty. It is the baker's story of friendship to the world. It is the message which our industry will tell to every consumer of bread during Golden Rule Week, the week beginning Sunday, December 6th, 1925.

—L. A. R.

"Wholesomest of meats is bread!
Of sauces milk is wholesomest;
A flowing brook, in gravel bed,
Is of all beverages best;
The heartiest toil gives earth its fruit;
The sweetest music is the lute."

—Old Welsh Song.

"Give bread for bread and do not let
your neighbor go hungry."

—Algeria.

BAKING TECHNOLOGY

*A Journal of
Applied Science
in Baking*



*Published by
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Come Let Us Work Together

THERE is no difference of opinion as to the greatest need of every baker. What he wants is a better chance to sell larger quantities of finer products. What he needs is a clearer idea of how he can bring his desires to realization. And is a leadership which will organize these needs and desires, these hopes and aspirations for a finer service to be denied the baker any longer? On the editorial page of a recent number of *Baking Technology* appeared these thrilling and inspiring words, "Make no little plans, they have no magic to stir men's blood and will not be realized. Make big plans;

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aim high in hope and work, remembering that a noble and logical plan will never die, but long after we are gone will be a living thing."

The story of the Buffalo Convention is now common knowledge. The highest water mark of organized effort set in those days of constructive planning is in full view of every baker who will lift his eyes from his work. Is there a single reason why every baker

should not step into the association boat and, forgetting all past disappointments, make a common purpose with us? The reasons for united effort under common leadership are simple and definite. They are:

To secure for everyone an adequate supply of well made, nutritious food in the form of baked goods.

To establish the position of the baker as the producer of the most important food.

To dignify the baker as the dietitian of the race.

The means by which these objectives may be attained are not so definite. And they will never be brought to the hand of the individual baker except by the fused efforts of the whole industry. But if in every town and city in every state, bakers, millers and supply men, helped by the other food industries which live only because of the importance of bread as the carrier of their products into consumption, and welcomed into service by teachers, physicians, dentists and parents, were meeting in common councils, not annually but constantly through the year, the time would soon come when a more generous supply of cereal foods would be placed on every table, at every meal.

How can these councils be formed? What can the individual baker do to bring all these influences to his bidding?

One thing is certain, he cannot accomplish much by his individual effort. He knows that because he has tried it and wasted his work.

Nor can he tell the story of his nutritious products and their role as the preventive of malnutrition through the medium of a local baker's organization, unless it is working to a common end with similar groups throughout the country.

The common effort which will bring results must be directed. When the secretaries of many bakery organizations organized an association of secretaries under the name of Bakers Associations Secretarial Conference, before they left the stimulating influence of the great convention, they created the means by which every movement which will advance the

industry may be made intelligently and at the proper time in all parts of the country.

As an illustration of one need of the direction of association activities to a definite end, one may study any half dozen programs of bakers conventions. The programs were interesting. They provided food for thought and pleasurable entertainment. They were successfully carried out and earned for their sponsors the appreciation of the membership. But except in occasional instances they did not touch upon basic problems which underlie the development of the industry. They were related to local matters, such as bread weight legislation, sanitary inspection, or unfair competition. They reviewed the processes of fermentation or outlined improved shop practices. In short they were excellent palliatives for the ills of the industry but they administered no substantial body building materials for the permanent benefit of all bakers.

Is it not time to study fundamental causes for unsatisfactory conditions within the industry and then to administer relief which will be permanent?

Why not then organize now through this new association of secretaries a general program for all conventions and meetings of bakers for the coming year? And what better objective can be found than the increased use of bakery products? If throughout the country the attention of bakers and their allies can be focused on one common goal for a single year, more definite progress can be made than will come in a generation of undirected and scattered effort.

The Increased Use of Bakery Products

The program for a year of hard work may well be built then to the single end, increased consumption of baked goods.

How shall this be accomplished? Will

a national advertising campaign be necessary and would money so expended bring results? Can every association work out its own plans to stimulate the sale of bread and cake and sweet goods? What campaign is practical? How shall it be organized? Who will direct it and furnish the munitions in the form of well-drafted instructions? That is the work of American Bakers Association through its Department of Trade Promotion. And to it will be brought the assistance of the Department of Nutritional Education and every other influence which has been built up for this hour of need by American Institute of Baking.

As a background for any plan for increasing the consumption of any food there must be built a receptive attitude on the part of the potential consumer. The need for the food must be established. Its high quality must be fully recognized. Its nutritional value must be common knowledge. The economy of its use must be appreciated. Every criticism of the food as inadequate, unbalanced, fat forming, constipating, deficient in lime or protein or crude fiber or vitamins must be fairly and fully answered. If any group of recognized standing has definite objections to its increased use, these objections must be overthrown. These essentials to the greater use of bakers' products will never be made clear to the consumer through the reiterated advice to make quality goods. Of course no effort to increase the use of any article which is not based on **genuine** merit and which is not supported by steady improvement in the quality of the service behind the product, can hope for more than a temporary success. But any endeavor to change in the slightest degree the eating habits which have been established for generations, which are fixed by racial customs and determined by social usage must be based on the education of mothers

and children to a clearer appreciation of the basic need for increasing the amount of bread in the ration.

The Educational Campaign Is Ready to Go

We have prepared the way for this campaign of education. In the nutrition laboratories of the Institute the data has been secured which answers every critic of bread or cake or pie. The support of the physician who is up to date in the newer knowledge of nutrition is assured. The great organization known as the American Home Economics Association has appointed a special committee to study the role of cereals in the diet. Through the money provided by the Robert Boyd Ward Fund, Inc., many helpful means of spreading the knowledge of better bread will be set to work.

We lack only the support of the baking industry for which all this preliminary campaigning has been done. We need now more than anything else the help of every organization of bakers throughout the country. There is no group which cannot take part in a nationwide effort to increase the consumption of its product and none which will not be benefited by the campaign in direct proportion of its own interest in the work ahead. Of course those bakers who are still so self-satisfied that they see nothing to be gained by co-operation with their fellows, will secure their increased business very cheaply. They will profit by the work of others. But such profit will not long remain to them, for there is no room in American industry for selfishness and individualism. And while American Bakers Association is working for the common good the greatest benefits from its efforts will come to those who work.

Can the association speak for the whole industry? Can it expect the co-operation of every baker as it plans and builds for his industry?

Mr. Grain O'Wheat

MR. GRAIN O'WHEAT is endowed with a winning personality as he tells the story of his life in a little booklet to be distributed by bakers early in December. He has been all over the world, with nation after nation, down through the pages of history, as they pushed on in their conquests of new soil in which to grow the family of O'Wheats.

Real happiness comes to him and his family at last when, raised in America in peaceful fields, they are ground into flour and sent in generous quantities to Mesopotamia to save the lives of homeless children.

We seldom see a simple little tale which more fully embodies the spirit of the staff of life and what it means to those who are dependent upon America's charity for their very existence.

The story of Mr. Grain O'Wheat is the baker's contribution to the splendid work of the Near East Relief. Thousands of copies of the booklet will go into American homes along with good white loaves of nutritious baker's bread. Grocers will distribute it in their deliveries. Bakers will enclose a copy in every purchase over the counter. School children will take it home to read again and so thousands of families will get a new appreciation of the value of our wheat food in the life of nations.

December 7th is set aside for International observance as Golden Rule Sunday. There is hardly an industry or association that is not finding some way to co-operate with the Near East Relief and help along the work of feeding and training thousands of orphaned children made helpless by war's terrors in Asia Minor. Local committees will be in charge of publicity and civic programs. The pulpits will be devoted to the subject on that Sunday. Golden Rule Dinners will grace

the noonday tables in our homes and contributions will insure the training and happiness of nearly three thousand unfortunate children for another year.

American Institute of Baking is supervising the printing of these booklets and of the window cards which help in displaying it for the bakers. The prices quoted are provisional, and will be reduced as the total number of booklets printed increases above a hundred thousand. All orders must be received by November twentieth to insure delivery.

L. A. Rumsey.

More Pie and Cake Eaters

Our association has often been called an association of bread bakers and the value of the work of the institute and its school has been little appreciated by bakers who are specialists in pie or cake baking. But as a matter of fact the work of the institute this past year has been concentrated on special studies for the benefit of pie and cake bakers and the program of our conventions will provide special opportunities for the discussion of the work we have been doing in these lines.

Every cake baker knows that the field for expanding his business is unlimited. He has but two obstacles to overcome, one the belief of nearly every housewife that her cake is better than the bakers, a fact still too generally true, and the other the persistent idea that cake is not a good food for children. And of course the baker will have to clear his own road to success. He can bake better cake than the average woman in her kitchen. But until he becomes a cake baker instead of just a baker to whom cake is but an item in the day's work he will penalize the cake industry and retard its growth as definitely as the poor bread baker has injured the sale of better bread.

How Special Libraries Work for Industry

LIBRARIES which are merely repositories for books are of little service. A modern library is as productive as any other branch of industry. Its books and pamphlets and libraries and clerks work for the benefit of industry and their contributions are essential to the speeded up production of our present era.

A typical example of the way libraries work for industry was the information booth which the recently organized Illinois Chapter of the Special Libraries Association operated at the Illinois Products Exposition held at Chicago, October 8 to 17, inclusive. The idea of the booth was to help the Illinois Chamber of Commerce to "sell Illinois". They planned to make the space allotted to them work overtime, with someone always on the job to give out facts and information and show what the special library is and does. They gave ready reference if the material was at hand, or if the questions asked required more thorough research, forwarded the information later.

The John Crerar Library, the Chicago Public Library, the Chicago Municipal Reference Library, the Newberry Library and the Chicago Historical Society loaned exhibits on Illinois. Brentano's books on Illinois and Chicago were displayed and many other concerns contributed topical literature for distribution. The equipment of the booth with lights, filing cabinets and other devices and its artistic setting of flowers and decorations were all provided through the generosity of Chicago business men who appreciate the importance of libraries in their daily work.

Reference material, books, business services, pamphlet and clipping files were

all installed and the working tools of the special library were shown in action.

A new field for special library chapters was thus opened, for no other group is so well equipped to gather statistics and impart special information. Perhaps the commercial organizations of other states and cities will follow Illinois and call on the special library chapters for co-operation when plans are being made for state or city expositions.

R. E. P.

American Food is Best

AUTHORITIES say that we do not encourage the preparation of American dishes in American style. We flock to French, Italian and Hungarian restaurants, and favor Chinese methods of cooking because we have but little appreciation of, or interest in improving, our own, although we boast of many native dishes and a long list of pure-bred American foods.

The old-fashioned Thanksgiving dinner is an American institution, and buckwheat cakes and syrup, two crust pies, Southern fried chicken, Boston baked beans and brown bread, and American clams, oysters and scallops are unequalled in popularity throughout the country. These are American dishes, the result of native ingenuity and skill, yet we, as a nation, do nothing to encourage an American system of good cookery.

We patronize foreign restaurants and are attached to foreign dishes because they are better for the money than any we produce, yet the food we produce is peerless, and who can say that many of our home cooks can't prepare wonderful meals? We may be a country made up of a hundred and one different nationalities, we should expend thought and time on dishes of American food prepared in a manner typically our own.

The Restaurateur.

BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

H. E. BARNARD, Editor

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NOVEMBER 15, 1925

We Work Together

To win through knowing our markets and developing their full potential possibilities, a higher place for the baking industry in the great family of America's business life.

A Perfect 36

A PERFECT 36 is a figure much admired by every one, but frequently it doesn't all belong to the one displaying it.

So it is with the figure 7,200, registered as Bakers and Associates attending the Buffalo Convention—they don't all belong to the American Bakers Association, and—why not?

Surely, if any Baker ever thought he had a logical reason for not being a member of the A. B. A., and was present at the Buffalo Convention, his reasoning has been knocked into a cocked hat, for nobody but a blind man could miss seeing the demonstration of interest and enthusiasm during the eventful week of September 19th, and—where there is great interest and much enthusiasm, there is usually a lot of merit.

Merit: that which deserves consideration, reward, esteem!

What say you, fellow-bakers who at-

tended the Buffalo Convention but are not members of the A. B. A.? Did not the educational features from every angle merit the time and the money spent by the A. B. A. and its associate members?

Are not its past efforts, present plans and future developments for a Bigger, Better and Busier Baking Industry deserving of your consideration? They must be, if you are at all interested in your own business.

Since you stopped work long enough to attend the Convention, and looked with interest upon the mammoth display of Baking Equipment, and listened to the intelligent discussions of Bakers' problems—do you not hold the A. B. A. in higher esteem?

Then, *for your own sake*, joint the American Bakers Association and give it its well-earned reward!

Performance is the best advertisement.

Expectantly yours,

L. A. SCHILLINGER,

First Vice-President American Bakers Association.

Utter, Yet Harmful Nonsense

THE chief aim of man from the day he emerged from primordial slime until his dinner hour today has been the securing of enough food to satisfy his hunger. His need of clothing and a home came ages after he was conscious of the call of his stomach for food. But a million years has taught him little as to the reasons for his food likes and dislikes and he is just as willing to sit and listen to a discussion of diets as he was when he debated the relative merits of snake and deer meat before the door of his prehistoric cave.

At least that assumption would seem to be logical in view of the fact that within the last few weeks such an intelligent group as the Women's Advertising League of Toledo gave of their time and interest to

listening to a talk on food in which the lecturer expounded the most amazing ideas of diet and health. They heard for example that an ideal breakfast, as the Toledo Times reporter records it, is one-half a grape-fruit and a glass of milk. They learned that fruit and bread should never be eaten together because the starch of the bread is in some strange way affected by the acid of the fruit. And as an example of wierd chemistry the scientist of the occasion is quoted as saying "sugar is absolutely taboo on fruit unless you want to form alcohol in your own stomach." And white bread was termed "absolutely deadly" and one of the worst causes of cancer.

It is of course to be assumed that the club members who listened to this amazing exposition of utter ignorance of the chemistry of food and the physiological processes by which it is metabolized in the body went back to their work unafraid of the calories which they were told "had killed more people than any one thing," and more determined than ever to avoid the path of the food faddist.

The pity of it all is that anyone who asks for an opportunity to expound his ideas on food finds it so easy to get an audience. Women's clubs, teachers' conferences, meetings of Rotarians, Kiwanians and all the other groups which come together for energy producing and mentally stimulating pabulum are told in all seriousness the most absurd tales of what to eat to live, what to avoid to be healthy, how to reduce and how to become plump. And in far too many cases the speaker has no background of knowledge, no standing among authorities in nutrition and no real information on the subject he discusses.

George E. Harter of the Defensive Diet League of America is reported to have made the amazing address to the Women's Advertising Club of Toledo. How many similar exhibitions of his utter ignorance of the subject of nutrition will he be allowed to

make? And when will the teachers of sound science, level headed practitioners of medicine, and well read dentists convince the public whom they serve that the chemistry of food as it is eaten is the same sort of chemistry which follows the immutable laws of the laboratory? Of course truth will prevail. It is unfortunate that sometimes it seems hard to distinguish between fact and fiction.

For Better Business

WHILE the ambitious plans of American Institute of Baking may appear idealistic and visionary to practical minded bakers and millers who have not yet sensed the value of co-operative efforts, as a matter of fact this work is neither new nor untried. President L. J. Schumaker, in writing of the work now being outlined for the year ahead refers to the splendid achievements of the National Dairy Council in Eastern Pennsylvania and urges similar activities among bakers. He says:

"We have worked closely with the Dairy Counsel of this section for some time. Our Dairy Counsel takes in Eastern Pennsylvania, Maryland, Delaware and part of New Jersey. Their Secretary has his office in Philadelphia and in addition to his office force has thirty-four persons working all the time in the field. In the nutrition field work he employs thirteen men and twelve women. They naturally do much of their work through the public schools but they also work through women's clubs and scores of other organizations. In the Dramatic Department he employs nine persons. They arrange and direct little plays for young people, in which milk is in some way featured or introduced. When this work was undertaken some of the milk distributors looked upon it just as an added expense, but in a little over a year's work he increased the consumption of milk in this territory over one million quarts per month.

Residual Sugar of Bread*

By C. B. MORISON

Of the American Institute of Baking

TASTE and flavor are among the most important characteristics of a high quality bread. This is recognized in bread scoring systems. At the American Institute of Baking the official score for ideal bread requires 20 points for taste and 15 for flavor, which is equivalent to 50 per cent of the 70 points allotted to the internal characteristics of the loaf. This is also 35 per cent of the total score of 100 points.

In this country there seems to be a national predilection for sweets. Some bakers feel that in consequence the much desired wheat flavor of bread has been sacrificed to the popular demand for sweetness. It is often remarked that bread is becoming more like cake. Other bakers hold opposite views, and it would be difficult to secure complete agreement among the trade on this question.

Visitors from abroad have in our hearing frequently commented on the sweet taste and flavor of American bread, and in most cases note with surprise the quantity of sugar and other ingredients used in bread formulas and the increased cost of production which follows from their use.

Thus, the relation of the amount and kind of sugar used in formulas to the production of sweetness of taste and flavor in the baked bread is of essential interest. How much sugar will be found in bread made from various formulas containing commercially pure sugar or available sugar forming ingredients? What is their qualitative and quantitative influence on the taste and flavor of the bread?

The term residual sugar content of bread is used here to denote the kind and amount of sugar present in the bread baked from a fermented dough. The residual sugar content may be dependent upon several factors, among which are the kinds and amounts of sugar originally added to the dough, sugars produced by enzymatic activity, the amount of yeast used, the temperature and time of fermentation, hydrogen-ion concentration and other factors which influence enzyme action; finally, oven conditions, especially those of temperature, and time of baking.

The ingredients commonly employed for the fermentable carbohydrate requirements of bread doughs are sucrose from cane or beet, refined dextrose (d-glucose), sold under trade names such as cerelese, malt extracts or syrups, and sweetened condensed milk. In addition to these commercially pure individual sugars, and sugar containing ingredients, various partially hydrolyzed starch products are employed containing variable amounts of reducing sugars, dextrans and soluble starch. Malt flours possessing diastatic power may also be mentioned.

There is little information in bread and baking literature on the residual sugars found in bread made from known formulas under observed or controlled fermentation conditions. It is therefore desirable to study the sugars of bread in materials whose history is known.

The results reported below were obtained from an examination of bread made according to commercial formulas, mixed, fermented and baked in the Institute Bakery by M. H. Joffe.

*The Residual Sugar Content of Bread, Cereal Chemistry, Vol. II, No. 5.

In our preliminary work on the residual sugar content of bread we have used cane sugar, cerelose, sweetened condensed milk and dried whole milk in sponges and straight doughs, in commercial formulas, mixed, fermented and baked under known conditions.

Determinations of sugar have been made in the bread from these doughs and the following results may be reported as typical:

A sponge and dough were prepared which contained the following sugar-carrying ingredients expressed as per cent on the basis of flour as 100:

Malt extract.....	1.67%
Cerelose	2.30%
Sweetened condensed milk.....	2.30%
Powdered skimmed milk.....	2.78%

The total amount of sugar introduced into the dough (sum of total sugars, maltose, glucose, sucrose and lactose) from these ingredients was approximately 3.2% of the total weight of the mixed dough of flour, water, yeast, salt, shortening, and the above sugar-containing ingredients. The flour contained 0.75% total sugar, calculated as maltose and sucrose by copper reduction. This amount of sugar calculated from the amount of flour used increased the total sugar in the dough from approximately 3.2% to 3.9%.

The total lactose in the dough was approximately 1.00% as calculated from the determination of lactose in the skimmed milk powder and the sweetened condensed milk, leaving about 2.9% glucose, maltose and sucrose available for fermentation.

The malt extract had a low diastatic power, 2° Lintner. The diastatic power of the flour was not determined.

The total yeast used in the sponge and dough was 2% on the basis of flour as 100.

The sponge was mixed at 80° F. and

fermented 190 minutes. The sponge was mixed with the dough at 82° F. and fermented for 30 minutes. It was then sent to the bench, scaled, rounded, molded by hand, panned and given a proof of 45 minutes at 92° F. The dough was then transferred to the Duhrkop oven and baked for 25 minutes at 475° F. After cooling one hour the bread was weighed, wrapped and sent to the laboratory for examination.

The moisture content of the fresh bread was 37.18%, and of the ground sample taken for the determination of sugars was 6.25%.

The analytical difficulties connected with the identification, separation and determination of the sugars in food products such as bread are complicated.

We are not prepared at this time to recommend special analytical schemes for the residual sugars in bread. The results reported were obtained by extracting the dried ground bread with ethyl alcohol and the reducing sugars determined before and after inversion by the official method of the A. O. A. C.¹

The clarification of the aqueous solution after evaporation of the alcohol by neutral lead acetate, and subsequent removal of the lead by anhydrous sodium carbonate was followed according to this method, but experiments with other clarifying agents, such as sodium tungstate, are being studied in this connection.

The reducing sugar, calculated as maltose before inversion was 5.51% on the basis of the moisture content of the bread (37.18%) and 5.82% after inversion. Such a slight increase in reducing sugar after inversion does not indicate that sucrose, if present, has contributed to the sweetness of the bread.

A comparison of the residual sugar content of bread made from straight doughs

¹ Official and tentative methods of analysis of the Association of Official Agricultural Chemists. Washington. 1920. p. 94.

containing 2.5% of cane sugar and cerelese, respectively (basis flour 100), as the only added sugar in the dough may also be mentioned. The total sugar content of the straight dough containing cane sugar was 2.00%, on the total weight of dough and the dough containing cerelese 1.85%, including the sugar present in the flour. The amount of yeast was 2% on the basis of flour as 100.

The formula of the two doughs was exactly the same, except one contained cane sugar and the other cerelese. They were mixed, fermented and baked under similar conditions on the same day, with but little less than an hour elapsing between the two mixings. The dough containing cerelese was mixed first, followed by the dough containing the cane sugar. The temperature of mixing was 80° F., first punch 81° F., second punch 82.5° F. for each dough. The total fermentation time was 190 minutes for each dough. They were then scaled, rounded, molded and panned by hand, proofed at 90° F. and then transferred to the Dührkop oven. The time of baking was 30 minutes at 475° F. The bread was cooled one hour, wrapped and sent to the laboratory.

The moisture content of the bread containing cane sugar was 37.25% and the bread containing cerelese 37.18%. The reducing sugar calculated as maltose was 2.97% before inversion and 3.30% after inversion in the bread from the dough to which cane sugar had been added. In the bread made from the dough containing cerelese, the reducing sugar before inversion calculated as maltose was 2.77% and after inversion 2.88%.

The slight increase in reducing sugar after inversion calculated as maltose noted in each of the breads does appear to indicate that sucrose (if the increase in reducing sugar is due to the inversion of this sugar), is present in amounts which would have a marked influence upon

sweetness of taste. The taste of the bread made from the sponge and dough was somewhat sweeter than either the bread made with cane sugar or cerelese.

The residual sugars of bread are probably very largely composed of reducing sugars, among which maltose predominates.

Further work is in progress on the identification and determination of the residual sugars of bread made with increasing amounts of cane sugar, cerelese and other saccharine products, with especial reference to methods of analysis.

Reducing Breads

Dr. Lulu Hunt Peters in her column on "Right Eating and Good Health" in the Chicago Journal takes a well merited shot at the so-called "reducing breads" when she says to a worried searcher for youthful lines, "There are no 'reducing' breads on the market. The so-called reducing breads have to be counted just as high in calories as ordinary bread. If you reduce from the use of these breads you do so because you follow the directions which come with the loaves; and by following these directions, any bread would serve just as well, without the disadvantage of paying so much extra."

From the Philippines

I am running a bakery besides teaching in a school. I wish you would favor me with some particulars about your institute. I wish to have some connection with it that I may improve my products and run my business on scientific lines.

A. R. Nazareno,

Dumaguete, Philippine Islands.

After visiting a modern flour mill, Prudence Penny, Home Economic Expert, wrote in her column in the Chicago Herald and Examiner, "Today thousands of home makers are buying delicious baker's bread made of this same flour."

Team Work in Industry

Progress Is Made Only When Every Group Does Its Part in the Forward Movement

THE baking industry is still unorganized. While more than twenty-five hundred bakers took part in the great Buffalo convention many of them sat in the meetings as individual bakers seeking information for their personal benefit rather than as units of a great industry eager to learn how their efforts might be co-ordinated for the building of a better service for every bread eater. But out of that splendid conference is growing a realization of the need of well knit organizations within the larger group, of sections of the national association in which cake and pie bakers can meet to discuss their common problems, of divisions of wholesale and retail and house to house bakers where matters of specific interest may be attacked and solved, and of groups of special workers, of engineers, salesmen, accountants, advertising men, secretaries, all the branches of the servants of the industry which are technical in character.

The problem of our association is no different from that of most of the large industrial groups. At the annual meeting of the dairy industry recently held at Indianapolis in connection with the great show of dairy cattle and the first real pure food show ever held, M. D. Munn, president of the National Dairy Council, told the many groups within the industry how team work was necessary not only to the prosperity of every group but as well to the continued progress of the whole dairy world.

His able summary of the needs and opportunities of his organizations is so applicable to those of the baking industry that every thoughtful baker will read his suggestions with appreciative interest.

"A quarter of a century ago business started an organization program which up to that time was unheard of. It met legislative resistance because the effort preceded knowledge of its economic importance and value. Those organizations which survived the political onslaught have blazed the educational way so that organization effort which twenty-five years ago met governmental condemnation, today receives government commendation. Today the business world knows, and the political world is sensing, the importance of proper industrial organization in its relationship to business economics. This 'newer knowledge of business' has caused a national awakening to its importance.

"Many industries have sensed this condition far ahead of us and have organized themselves accordingly. Some branches of our industries have already seen the on-rushing change and are preparing for it; others have not fully sensed or grasped it, but hopeful signs are evident in these groups.

"The time has come when each one of these groups must begin to give unselfish, earnest consideration to the fulfillment of the obligations imposed on each and all alike. The proper fulfillment of these obligations to the industry, to each group and the consuming public depends upon proper organization, and the full realization that the action of one group in relation to the industry affects all other groups. For this reason no one group should attempt to determine a policy or problem that affects the industry as a whole without joint conference and a determination of the effect such action will have upon the industry itself.

"To do this, we must have comprehensive group organization in each branch of the industry willing to recognize the 'give and take spirit' necessary for effective correlation and joint determination of industry policies and problems. The first question that naturally comes to one's mind is how far can we properly go in determining these policies and adjusting these problems through organization effort and conference.

"There is no escaping the fact that whatever affects any one group in this industry adversely has a corresponding reactionary effect on all the other groups; in other words, on the prosperity of the industry as a whole. This in itself should impel consideration of what effect any group action relating to the industry may have upon the other branches of the industry and consequently upon the industry itself. We should at all times shape our actions so as to harmonize with the highest form of industry consciousness. This can be done only when each group organization has in mind the welfare of the industry as a whole rather than what effect any given action or policy may have upon membership of the individual group alone.

"This brings us to the most important thing to be considered; namely, some plan under which we can have conferences of those composing the various group organizations, so that we may better understand the economic conditions surrounding each group, as well as those affecting the industry as a whole; thus building confidence in the minds of all that no one group will take action upon any policy or problem that affects the industry as a whole, or what may adversely affect the prosperity of any one group, without such group having an opportunity to express its views.

"It would not be difficult to establish an interchange of ideas through some well

developed plan of conference. Until we do this we are going to have, every now and then, adverse currents started that will have a direct bearing upon the success and stability of this industry.

"No new organization is necessary properly to effect such a plan for conferences. All that is necessary to do is to properly develop existing organizations and then formulate a plan for periodical conferences, or better still, actually hold the conferences. Such conferences should not go into details of individual business or questions, the solution of which concern only a single group, but rather to develop and establish general economic policies and principles under which all would 'play the game' as a team in the interest of the industry and the public with the full realization that the prosperity of each group depends upon the prosperity of all."

I have received the "Resume" Baker's Helper has printed of the conventions of the baking industry from the inception of the association up to the present time. The reading of this history of our progress should arouse the enthusiasm of all the old timers who helped blaze the trail to the enlightenment and betterment of a plebian calling, the status of the baker in those early days, to its present status where the baker takes his place, not alone as a baker, but as a leading citizen in every walk of life. Mr. George Ward's words at the Past President's banquet aptly expressed this when he said, "I always want to be remembered as George Ward, the baker." Surely the present status of the baker was worth fighting for and is worth fighting to maintain and raise to still higher levels of service.

Simon Hubig,
Simon Hubig Company.

"Acorns were good till bread was found."

Bread Rich in Milk Solids Satisfies Demand for Balanced Food

By H. E. VAN NORMAN,
President American Dry Milk Institute

"IMPROVE OR PERISH" is a short stating of the law of life. The baking industry is no exception to this law. Like many other industries, it has been aroused to a realization that changes are taking place more rapidly and of greater importance now than ever before. "I always have done it that way" can not long compete with new machinery, new yeast foods and new methods coming in to the industry so fast that some men can not keep up and will lose out in the race for business and a living, because they will not change their ways—ways which have seemed good in the past, but will not be good enough to meet the new ways of today and tomorrow.

Bread of some kind is one of, if not the oldest food used by man. It is probably used by the people of more countries than any other one food. Old as is bread making, "staff of life" though it may be, it is not yet perfect, for man is continually trying to make it better.

Wheat flour, white wheat flour, is America's foundation for bread. How can bread be made better is asked.

Our Children Are Hungry

The horrors of war have taught us many things: First—That in the land of plenty, many, especially children and young people, are partially starved, for want of something left out of their daily bread, meat and potato diet. Second—That in our efforts to feed our armies and ourselves, we were overlooking one of our most valuable foods, the food solids of skim milk, sometimes actually throwing them away, but more often feeding

them to animals, then eating part of the animal as meat, but throwing away the remainder, yet this food itself has no waste. All is digestible, usable and of the highest value for human food. In fact, the scientific research of McCollum, Sherman, Mendel, Osborne, Ritter and others through the past ten years shows it is the food that supplies what is most lacking in the ordinary diet.

Milk has risen from a "baby food", "good for children" to the dignity of a most important place on our food list; a food that young and old, banker, laborer and clerk eat, at home, at factory, lunch counter, hotel and club.

How Milk Improves Bread

Why? Because it supplies vitamins; calcium and phosphorus for the bones and teeth; protein of superior character and usefulness in building tissue and muscle; and milk sugar, a valuable energy producing food as well as one which favors the development of desirable bacteria in the intestinal tract and retards the growth of less desirable forms.

But all of these are in the skim milk, the part of the milk we have been throwing away, unappreciated, under valued, all because common skim milk is "thin", "blue" and "watery looking".

Science again to the rescue, has shown us how to dehydrate skim milk; that is, drive the water out of it, concentrate the food solids in dry form, known in the market as dry skim milk, and often called according to the process by which it is made "spray" powder or "roller" powder or "flake". Twenty years of effort

have so perfected the processes of drying that the high nutritive value of the food solids is fully preserved.

The Value of Skim Milk

In this concentrated form, dry skim milk usually contains 8% of milk minerals, of which lime salts, calcium and phosphorus are especially important; 38% is milk protein, worth to the body considerably more than the same amount from legumes, cereals or meats, because of the difference in its make-up; 50% is milk sugar (lactose), the food and health value of which it is apparent from recent studies, is greater than heretofore understood. There is also a trace, about 1%, of fat and 3% of moisture.

Dry Skim Milk keeps well if not exposed to the air in damp rooms. It has the property of taking up moisture easily. That is why it dissolves easily when reconstituted, but it is also the reason for protecting it from damp air.

How Skim Milk is Best Used

Dry Skim Milk is best eaten in some food which it enriches, because of its high mineral, protein and milk sugar content and where its bone and teeth building qualities are needed. While there are many foods to which the housekeeper, cook and chef may add Dry Skim Milk, the baker has the largest opportunity of all for bread from white flour is peculiarly lacking in the very food qualities Dry Skim Milk is rich in; namely, lime salts, protein, lactose.

There is rapidly growing up in this country a great body of teachers, educators, writers and lecturers who understand the character and value of different foods, who are telling the mothers and the school girls of today, and they will be the home makers of tomorrow, about these different foods. They are pounding home the lesson that bread, meat and potatoes alone won't grow strong, healthy

children or make men and women fit for work and play, without the addition of certain other foods to balance these.

A Real Advance in Nutrition

A big step in the direction of balancing white bread is taken when the baker includes Dry Skim Milk in his bread and other bakery goods.

Dr. McCollum of Johns Hopkins University, says white bread made with adequate content of milk solids is more desirable for most people than the whole wheat breads.

Dr. Sherman of Columbia University, says: "American diets are probably more often deficient in calcium than in any other chemical element." He further says certain functions of the body are not rightly performed if the food does not supply a proper balance between the calcium and the phosphorus.

The inclusion of Dry Skim Milk in the bread dough mix increases several times the mineral of the loaf and does it with the calcium and phosphorus from milk, than which there is no better available in any food. It not only brings up the protein of the loaf, but does it with a protein peculiarly valuable and useful. Dr. McCollum has said one pound of milk protein is more useful than six pounds of protein from leguminous plants or three from cereal grains.

In addition to the food or nutritional value of these milk solids, Dry Skim Milk makes a bread loaf of more attractive color, pleasing texture, desirable flavor and one which does not stale or dry out so rapidly.

Skim Milk Increases Absorption

As a result of the dehydrating process, Dry Skim Milk is a concentrated product with very little moisture in it. It has a very marked power to take up water again. It does this so much more rapidly

than does flour that most bakers find it desirable to take part or all of the water for a batch of dough and add the sugar, then the Dry Skim Milk and mix. If this mixture is allowed to stand for a few minutes or up to an hour, it will blend all the better with the other ingredients of the dough batch.

With 100 pounds of flour as the basis of a batch of bread dough, the baker has established the amount of water needed. If five pounds of Dry Skim Milk are to be included in the batch, enough more water must be used to moisten the Dry Skim Milk as well as the flour.

Research work at the American Institute of Baking shows that not only must more water be added to the dough batch when Dry Skim Milk is used, but that the dough holds the water more tightly, bakes out less in the oven and dries out more slowly when the loaf stands.

What Milk Solids Do

These extra milk solids actually increase the amount of bread produced from a barrel of flour as well as producing a rich, golden brown color and a soft velvet texture.

The foregoing relates to improvement of bread by the addition of Dry Skim Milk on the basis that the loaf of bread will look, taste, feel and keep better. The customer will want it, but may or may not know what the baker had done to improve the loaf. As housekeepers learn more about foods and their value and which ones to choose, it will become more important for the baker to tell his customer about the added value he has put in his bread.

The public educational work the past few years has developed an appreciation of milk which prompts some bakers to make milk bread; that is, use part or all whole milk instead of water to mix up the dough batch.

Formulas for Milk Bread

To make a milk bread that will conform to the present requirements, there must be used as much or more butter fat and skim milk solids as would be supplied by using one-third milk and two-thirds water for mixing the dough. This will enable the baker to "get by" the law as to name.

Milk is ordinarily 85.7% water, 3.5% fat and 9% skim milk solids. The baker can have in his store room Dry Skim Milk to supply the solids not fat; he can have good butter for the fat, and with a hydrant for water supply, can put these milk solids together in any proportion he wishes to.

The use of one pound of butter and two pounds of Dry Skim Milk in each hundred pounds of flour would meet the legal requirements of the government and most states. The baker may increase either or both the butter and the Dry Skim Milk to a little over double these amounts, if the public appreciates the improved appearance, flavor, color, nourishment and keeping quality of his product.

Better Bread Without Increased Cost

Reports so far made, indicate that the addition to the dough batch of Dry Skim Milk up to five pounds per one hundred pounds of flour actually increases the number of loaves made per barrel of flour; so the increased value of the loaf is a selling advantage without cost.

In the case of whole milk bread, however, the cost of the butter increases the cost of the loaf, so that "milk bread" must usually sell for a little more than a regular loaf made without butter, but using the usual lard or similar shortening.

Since most people spread on a slice of bread more butter than can be put into the bread in the making, the practical business thing is for the baker to enrich his loaf by including Dry Skim Milk in it and let the customer spread the butter on it when it is eaten.

Up From The Soil

The Story of Wheat from the Field to the Table as Told in a Volume from The Manhattan Library of the Bank of the Manhattan Company

The contribution of the golden loaf to the better nutrition of mankind is constantly increasing as the modern baking industry leans on science and finds in laboratories of research and service the explanation of problems unsolved through centuries of craftsmanship. In this fifth installment of "Up From The Soil" the service which American Institute of Baking is giving is interestingly told.

Chapter Nine

THE GOLDEN LOAF

THE primitive man who plucked the head of wheat from its stalk, separated the grain from the chaff by rubbing between his palms, winnowed it with a gust of his breath, milled it with his grinding molars and swallowed it raw, had a simple method and a simple life. The entire process of the food industry was performed in the one place by the one individual.

How changed it all is today! Abundance, gathered from great distances, made into delicious foods, and served in endless variety, has brought increased nourishment and more varied diet to rich and poor alike. Of all the swift industrial changes that have come into American life, the change in bread-making is perhaps the most recent and is certainly one of the most remarkable.

By their breads we may know the peoples of the earth—the Scotsman by his scones, the Austrian by his twist, the Frenchman by his three-foot crusts, the Italian by his huge circular loaves and his bread sticks. Each bakes according to the manner of his country, and these and other nationalities have brought the Old World breads to the New. But

America, has developed a bread of its own which, from the standpoint of American taste, is an improvement on all the rest.

The bread loaf in an unobtrusive place
Displays its cheerful, honest-featured face,
A coin of triumph, from the vintage struck,
Of chemistry, skill, faithfulness and luck.

Thus Will Carleton in his "Farm Festivals" paid tribute to the product of the thrifty housewives of his generation. The tribute is even better deserved today, with the word "luck" stricken out. For "chemistry, skill and faithfulness" have been reinforced by invention and science, and the modern baker has been enabled to produce loaves which do not vary in quality from day to day. Any one familiar with a given brand may know before removing the wrapper exactly what quality will be found within.

Before the World War, about two-thirds of all the bread consumed was baked in the home kitchen, which today produces probably not more than one-half of our supply. Suddenly has come the realization that baking, until recently a household or neighborhood craft, has grown to a place among the leading industries of the country.

The number of individual baking concerns is estimated at about 35,000 and some of these are of very large capacity,

turning out even as high as 100,000 loaves a day. The United States census reports a bread and roll production of 8,429,738,953 pounds by 18,739 bakeries for the year 1923, not to mention 1,150,000,000 pounds of biscuits, crackers and cookies. And yet the average American eats less bread than the average European.

For many years the growth of commercial baking was slow and "baker's bread" was a term of reproach, since such bread was apt to be dry, tasteless unappetizing fodder, produced by the hardest kind of physical toil, frequently in cellars. Cheapness was its sole recommendation. Early in the present century, there appeared the first machine that was to help transform baking from a craft to an industry—merely a device which moulded dough into loaves for the oven.

Even more important was the invention of a machine and a process for making dough. This process, for the first time in history, developed to a maximum all of the gluten of the flour and brought together in the dough its constituent parts as a homogeneous mass. Bread made by this process was found to be more moist, as well as more digestible and nourishing than ever before.

Then came dough-mixing apparatus temperature and humidity control for the air about the rising dough, temperature control of ovens to insure uniform baking and a multiplicity of other ideas from the busy brains of inventors who began, more and more, to realize that power machinery might play a part in solving the problem of the table.

But modern industry leans hard upon science as well as upon invention and presently this great resource also was invoked. Pasteur, the French bacteriologist, pointed the way by determining that the leavening power of the loaf depended on a micro-organism, yeast, ca-

pable of being cultivated and controlled. Then came the increasing use of laboratories, until today, these are considered necessary to the equipment of every large bakery. In them, there is carried on the testing of ingredients for compliance with fixed standards, and in them occurs the constant research for new knowledge and the perfecting of improved methods.

To the small neighborhood baker, also, the results of the latest scientific and mechanical research are made available. In the center of the country, at Chicago, an experimental and educational institution—the American Institute of Baking—is maintained by a voluntary organization—the American Bakers Association—which may be joined by any baker. Here yeast, bread, flour, dough and other bread materials are studied chemically, biologically and otherwise, and the results are disseminated to members. In the Institute's school for bakers, students are thoroughly trained in the most advanced knowledge of the art of baking.

As already is the case with the milling industry and likewise on the successful farm, muscle power and the inexact "rule of thumb" are rapidly becoming obsolete in large-scale baking. Human hands no longer touch materials, dough or bread, and human brains, through machinery, perform all the operations. Flour, milk, yeast and other ingredients in the most exact proportions become loaves of dough through machinery. By the thousand, they are subjected to exactly regulated heat and come forth as browned loaves in sealed wrappers, first to be opened by the consumer. Every movement and condition in the entire process has been as exact as the multiplication table.

Baking has attained the time-saving and waste-saving methods of the modern industrial system, of which it has become an important part. (To be Continued)

Bread Pudding

Its Nutritive Value

By ROSCOE H. SHAW, *Chief,*

Department of Nutrition, American Institute of Baking

BREAD pudding has frequently been called the humble cousin of the pie but none of the glamour surrounding the pie has been accorded it. Sometimes it also has been called "The poor man's dessert." In spite of this it has a proud ancestry because it is a lineal descendant of the famous English plum pudding.

The transition of the plum pudding into the bread pudding came perhaps early in the old colonial days. Our grandmothers in the new country found it difficult to procure some of the ingredients that made up the plum pudding of the old. The necessary omissions and substitutions resulted in a less rich, but more easily digested and nutritious dish.

Puddings may be cooked either by boiling, steaming or baking. The first method is the oldest and is the one referred to in the old verse:

"A bag pudding the king did make
And stuffed it well with plums
And in it put great lumps of fat
As big as my two thumbs."

In boiling puddings it is necessary to enclose them in a sack, the inside of which is dredged with flour. The sacks are then placed in slowly boiling water and cooked in this manner for some hours. The second or steaming method is somewhat easier than the first, but the third, or baking, is by far the easiest and the one in common use today.

The simplest of all bread puddings is made from bread, milk, eggs, sugar, a little salt and flavoring. Other and more elaborate puddings have been built up from this by the addition of butter, raisins, fruits of various kinds, nuts, jellies, etc.

By long usage bread pudding has become a staple article of diet. In the nutrition laboratory of the American Institute of Baking, feeding tests have been conducted with some dozen or more of our common articles of diet such as bread, pies, apples, potatoes, cabbage, spinach, etc., and it seemed desirable to learn how the nutritional value of bread pudding compares with these.

The feeding test was conducted with young white rats in their early vigorous growing period. The pudding was made according to the foundation formula given in the paper by Miss Given which follows this one, except that the bread was not grated and no flavoring was added. Two cups of stale bread to a quart of milk were used, and to this were added two eggs, one-third cup sugar and a half teaspoonful salt. It was prepared and baked strictly according to the directions given in the paper mentioned. After baking, the pudding was exposed in thin layers to a current of warm air. The temperature during drying was never far above that of the body, and the drying was usually completed in from 8 to 10 hours. The pudding was then ground to a coarse meal and fed to the rats in this condition. This procedure was necessary partly because of the inconvenience attached to supplying fresh pudding each day, but principally because the rat, if presented with the fresh material, would naturally pick out that part which appeals to him most and leave the rest.

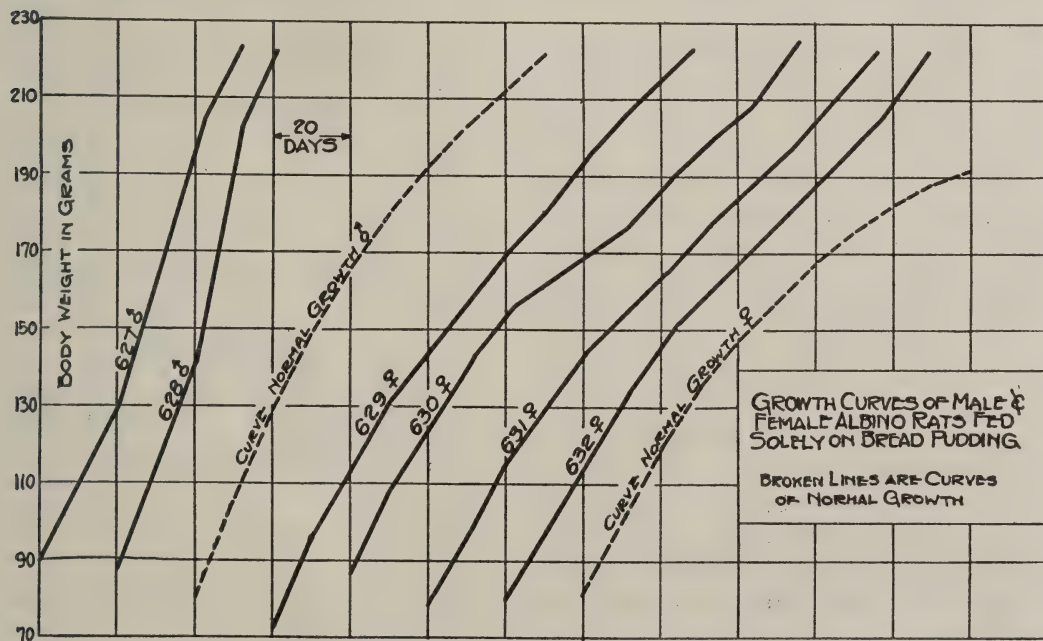
The animals were confined in individual cages and were under close observation. Beside their diet of bread pudding, a plentiful supply of clean drinking water

was always available to them. It was evident from the beginning that the rats liked their food. They grew in a satisfactory manner and at all times had the appearance of well-fed and healthy animals. Male rat 627 weighed 90 grams at the beginning of the experiment, grew regularly and consistently until he weighed 275 grams when the experiment was discontinued. Male rat 628 weighed 88 grams at the beginning and 319 at the end. Female rat weighed 72 grams at the beginning and 228 grams at the close. In the same way female rat 629 gained from 87 to 221 grams, and female rat 631 from 78 to 217 grams. The accompanying chart gives the growth curves of the animals under test. The broken lines are curves of normal growth and show how they would have grown had they been given a diet complete in the food essentials required for growth. It will be noted in every case that the growth was above the normal. In previous papers we have called attention to the fact that

few single foods are complete in themselves—that nearly all lack balance. It is evident from our results that bread pudding may be included in these few as far as the growth of young animals is concerned.

We have reason to expect such results when the ingredients that go into bread pudding are considered. The proteins of the bread are supplemented by those of the milk and eggs. An abundance of carbohydrates is assured from those of the bread as well as the added sugar and the lactose of the milk. The necessary mineral salts are supplied by the milk, and there are few better sources of vitamins than are milk and eggs.

There is no form of food more easily or completely digested than bread. No form of food can be so completely utilized. Even when too stale for the table, many uses have been suggested for it. When properly made into bread pudding a very tasty and nutritious dish is assured.



Quality Bread Puddings

How To Make Them

META H. GIVEN

Director of Home Economics, Evaporated Milk Association

The following recipes have all been tested by Miss Given in the Department of Home Economics of the University of Chicago. If the directions are faithfully followed tasty and nutritious puddings will result.

Bread Pudding

(Foundation Recipe)

- 4 cups scalded milk, or
- 2 cups evaporated milk and 2 cups hot water
- $\frac{1}{3}$ cup sugar
- 2 cups stale bread crumbs, grated
- 2 eggs
- $\frac{1}{2}$ tsp. salt
- 1 tsp. vanilla or $\frac{1}{2}$ tsp. grated nutmeg

Soak the bread crumbs in the hot milk for 15 minutes. Beat eggs slightly. Add the sugar, salt and flavoring. Combine egg mixture with milk-crumbs mixture and stir until well blended. Pour into an oiled baking dish and set in a pan of hot water. Bake an hour in a 300-degree F. oven, covering the first half hour of baking. The pudding should be well browned on top when done and a knife run through the center will come out clean.

This is the simplest form of bread pudding. If less prosaic puddings are desired, there are innumerable variations of this recipe possible to suit any taste or occasion. For example: The pudding may be made sweeter by the addition of more sugar or half cup honey, or half cup jelly may be used in place of the sugar. The sugar may be caramelized to give a pleasing flavor.

More eggs may be used to make a richer pudding. The eggs may be beaten separately, folding in the stiffly beaten whites last. This is a puffy, souffle-like pudding.

Fruits and nuts are a delicious addition.

Meringue made of two whites of eggs and half cup of powdered sugar may be put on top of pudding and delicately browned. Marshmallows or jelly may also be used to top the pudding.

The addition of fats makes a richer pudding. Butter and suet are generally used.

Mix and bake all the following puddings according to general directions for foundation pudding. Any additional directions follow the recipes.

Bread and Butter Pudding

- 4 cups scalded milk, or
- 2 cups evaporated milk and 2 cups hot water
- $\frac{1}{3}$ cup sugar
- 2 cups stale bread crumbs, grated
- 2 eggs
- $\frac{1}{2}$ tsp. salt
- 1 tsp. vanilla
- $\frac{3}{4}$ cup grated cocoanut
- $\frac{1}{4}$ cup butter

Add cocoanut and butter with crumbs to hot milk.

Butterscotch Bread Pudding

- 4 cups scalded milk, or
- 2 cups evaporated milk and 2 cups hot water
- 1 cup brown sugar
- 2 cups stale bread crumbs, grated
- 2 eggs
- $\frac{1}{2}$ tsp. salt
- 1 tsp. vanilla
- $\frac{1}{4}$ cup butter
- $\frac{3}{4}$ cup raisins, or $\frac{1}{2}$ cup chopped almonds
(may be omitted)

Add raisins or almonds after all other ingredients are combined.

Chocolate Bread Pudding

4 cups scalded milk, or
2 cups evaporated milk and 2 cups hot water
 $\frac{3}{4}$ cup sugar
2 cups stale bread crumbs, grated
2 eggs
 $\frac{1}{2}$ tsp. salt
2 squares bitter chocolate
1 tsp. cinnamon
 $\frac{1}{4}$ cup butter
 $\frac{1}{2}$ cup chopped nuts (may be omitted)

Melt the chocolate over hot water. Combine with half cup of the milk and the sugar and boil to a smooth consistency. Combine chocolate mixture with milk-crumbs mixture. Add nuts after all other ingredients are combined. A meringue is especially nice on this pudding.

Caramel Bread Pudding

4 cups scalded milk, or
2 cups evaporated milk and 2 cups hot water
 $1\frac{1}{3}$ cups sugar
2 cups stale bread crumbs, grated
2 eggs
 $\frac{1}{2}$ tsp. salt
1 tsp. vanilla
 $\frac{1}{4}$ cup butter
Marshmallows

Caramelize the sugar by sifting it gradually into a hot frying pan. As soon as it liquefies and takes on an amber color, add caramel to milk and heat in top of a double boiler until caramel dissolves. Then soak crumbs. Fifteen minutes before removing from oven, top pudding with marshmallows and delicately brown.

Fig Bread Pudding

4 cups scalded milk, or
2 cups evaporated milk and 2 cups hot water
 $\frac{2}{3}$ cup sugar
3 cups stale bread crumbs, grated
2 eggs
 $\frac{1}{2}$ tsp. salt
1 cup chopped figs
 $\frac{1}{2}$ cup chopped nuts
 $\frac{1}{2}$ cup finely minced suet

Combine in usual way adding figs and

nuts last. This pudding is nice baked in molds, and served with hard, whipped cream, or creamy sauce.

Orange Bread Pudding

2 cups orange juice
2 cups scalded milk, or
1 cup evaporated milk and 1 cup hot water
 $\frac{2}{3}$ cup sugar
2 cups stale bread crumbs, grated
4 eggs
 $\frac{1}{2}$ tsp. salt
1 tsp. grated orange rind
 $\frac{1}{4}$ cup butter

Mix pudding in usual way with the exception of beating eggs separately, folding in stiffly beaten whites last.

Queen of Puddings

Spread over the top of bread and butter pudding half cup of jelly. Make a meringue and spread over jelly, then delicately brown.

Sauces

The plainest of pudding if baked in a mold and masked in a sauce, are transformed into the most tempting of desserts. Any of the customary sauces may be used for this purpose.

Chemistry Behind the Dollar

IN a recent address before an organization of bankers, Dr. John Teeple said, "Given any chemical industry today, I would rather judge its future by its fixed attitude towards research rather than by its fixed assets, its working capital, or its past earning power."

When banking interests place chemists on their advisory boards, as they are doing today in more than one financial center, fewer loans will be made for the promotion of scientifically unsound industrial projects, and industry as a whole will have a clearer conception of the fundamental importance of research as the cornerstone of constructive effort.

Partners for Service

How Farmer and Baker Work to Feed Our Growing Population

By RENICK W. DUNLAP,
Assistant Secretary of Agriculture

Wheat on the farm is not bread on the table. And it is no longer possible to grow any kind of wheat with assurance that the miller will grind it or the baker use it for his loaves. Modern bakery practice demands the finest flours and in an effort to provide the wheats which will best meet this need the Department of Agriculture is breeding better wheats just as for many years it has worked to improve the strains of beef and dairy cattle. This work, will bring greater profits to the wheat grower and better flour for the bakers needs.

THE baking industry is one of great importance to agriculture. It is dependent upon agriculture, and agriculture is dependent upon the baker. Thus I deem it highly in order that the Department of Agriculture be represented at such an important meeting of bakers from all over the nation. Many of our problems are mutual, and their solution will aid us both. The success of one is the success of the other.

Your industry and the industry of farming must have begun about the same time, back in the dim early times of history. They have progressed down through the ages along parallel ways. You yourselves have probably gone into a field of wheat and taken a ripe head of wheat, rubbed it and blown away the chaff and eaten the grains. When you did that you enacted the entire process of the food industry from beginning to end. That is the way primitive man separated, winnowed and milled his grain. Civilization has changed all that. Or did civilization grow out of it? I think we are safe in assuming that wheat culture has always been co-dependent with human culture. The first and most vital need of humans is food, and wheat is the

most staple of the foods. Thus the progress of one keeps step with the other.

History and Wheat

For many years America has held the leading place among the world's producers of wheat. The story of American wheat raising is interwoven with that of our nation itself, and must be considered by any student of our government building forces and American social structure. The true story of any race or nation is not so much the biographies of kings and rulers as it is the account of its subjects and citizens and their industries. In other words, the most illuminating history of America is the account of our industries, inventions and social developments. The history of America is the history of the butcher, the baker, and candlestick maker. Up to a century and a half ago American wheat growing centered near the Atlantic coast, then the cheaper, lustier valleys of the Genesee in New York and the Juniata in Pennsylvania called to the wheat growers, and migration followed. This was the beginning of a series of great movements westward. After the Genesee came Ohio, then Illinois, and then on until the

prairies which were then known as the great American desert, became the wheat gardens of the world, flooded with grain from Montana to Texas.

Where Our Food Grows

We have today some 114,000,000 people, about one-third of whom consist of farmers and their families. Our 500,000,000 acres of improved farm lands are valued at seventy-eight billion dollars. The agricultural product of our country amounts to about fifteen billion dollars a year. Of these 500,000,000 acres about 54,209,000 acres were in wheat last year and the value of that crop was \$1,136,596,000. Vast as that seems yet it is twenty million acres less than the wheat acreage of 1919.

But wheat on the farm is not bread on the table. In between the producer and consumer come the transportation, milling, marketing, baking and retailing. These are necessary and often costly elements of the final product. More progress has been made in the last half century in all of these various functions than was made in centuries before. The farmer is now able to produce an acre of wheat with as little as three hours of actual toil. A century ago it required sixty hours. It is estimated that ten hours is about the average today. He no longer has to haul it to the mill in his wagon, have it ground and take it home as flour and bran, and have a market limited by the distance his horses could travel. Today railroads, improved highways and waterways have made his market world-wide. And in the near future it is highly probable that air will also be used commercially. The mill is no longer a one-man affair with its heavy grind stones and splashing water wheel, but it is a great plant, and the miller has become a business man with hundreds of employees.

Food Production a World Problem

The baker is no longer confined to one

town or city, but may extend his market as far as he desires. There is no limit anywhere. In short, the progress of the last fifty years has made this whole matter of food production a national and even world-wide problem, instead of a community one. That is the reason for a department of agriculture down in Washington, and it is the real duty of that department to attempt solution of these problems. We first have to see that the food is raised, then we must help solve the problem of markets. That is why the science of baking is so closely related to the science of agriculture.

In the marketing of grain, investigations are necessary on the milling and baking qualities of wheat and other grains for the purpose of determining the relation or intrinsic values of such factors as test weight per bushel, gluten content and quality, color, texture, general appearance, different forms of damage and mixtures of various impurities and treatment to which grain is subjected in handling. All this is necessary in order not merely that grain may be properly graded but also that the most suitable kinds of grain may be bred, introduced and grown. This work has a most marked effect on farm operations, and directly affects the miller and baker.

Well Bred Wheat

The cereal breeders of the department particularly those engaged in the breeding of wheat, work with those engaged in the studies of grain markets and standards. In order that a new variety may be readily acceptable to the farmer and to the grain trade it must be determined before it is distributed that it meets the demand of the market. Otherwise it would be no advantage but an actual detriment to introduce a new variety of wheat which yields more than a variety the farmer is now growing, but which has a lower milling and baking quality so that he would

receive a lower price for it on the market. Therefore, the plant breeder and the market specialist must work together to see that only these varieties are distributed when they are at least as good as the varieties now generally grown.

Diseases play an important part in determining the market grade and value of cereals. The presence of smut in any considerable quantity is always noted in grading wheat and the price materially reduced because of it. The shrivelling of wheat caused by rust and the presence of moldy and spoiled kernels materially affect the grade and market value of these grains. Therefore, the work of research specialists either in developing methods of controlling disease or in producing resistant varieties is of importance not only to farmers but to the grain trade, millers, bakers and the consumers.

The grain trade for the past two or three crop years has been paying a premium for wheat having a higher percentage of crude protein. The premiums for protein wheat have been usually 8 to 10 cents for each per cent of protein above 11 to 11½ per cent, other quality factors being satisfactory. If these prices are justified, it is probably because the bread baker demands a high protein flour for satisfactory bread making purposes.

Will Protein Laboratories Help?

It has been suggested that protein laboratories be established at the more important wheat markets for the purpose of providing control and appeal service to the trade. Such an agency would aid materially both farmer and baker. The farmer could get better prices, and the baker could be assured by a disinterested party that the wheat he bought was as it was represented. The baker could be assured of a low protein content for his products which require it, and a flour with higher protein and of good quality

for other purposes. Some investigators claim that the terms "string" and "weak" flour are principally a matter of correct and incorrect fermentation. If this is true, the great economic loss suffered by those states which produce the softer type of wheats which are not considered so good for bread making purposes can be minimized by further experimentation and research in this department.

Science and Invention Help

Of all the swift industrial changes that have come into American life, the change in bread making is perhaps the most recent and is certainly one of the most remarkable. I was much surprised to learn that before the Worlds War about two-thirds of all the bread consumed was baked in the home, which today produces not more than one-half of our supply. That science and invention are helping the baking industry is very apparent by the recent improvements in dough mixing apparatus and humidity controlling devices. Muscle power and inexact "rule of thumb" methods are rapidly being replaced by more accurate, scientific methods and improved equipment which appear to be almost perfect.

The probable production in the United States is ten billion pounds or more of bread, biscuits, crackers and cookies a year. That means the baking industry enables the American farmer to profit not only in his growing of wheat, but also furnishes him a vast market for eggs, sugar, milk, raisins, and lard which are almost essential ingredients of the nutritious products of the bakeries.

A Common Duty for All

But of all these problems for which the government is trying to find solutions, there is a simultaneous duty on the part of the farmer, the manufacturer of food products and the consumer, to get to-

gether and help to solve their problems by co-operation one with the other. It is already being done. That is evident when one contrasts American conditions with those, for instance, prevailing in Russia. Before the war, Russia was second only to the United States in wheat production and exported 162,000,000 bushels, or half again as much as we exported. Afterwards this gave way to deficit and Russia was forced to call for millions of bushels from outside sources. What had happened? Russia's land was still as fertile, and her climate was just the same. The answer is that there is no co-operation between the peasant farmers, the government, and the consumers. There was no private enterprise or ownership, and, quoting from an excellent little booklet, "Up From The Soil", recently published by the Manhattan Bank, "The hand is wanting in energy when the heart lacks opportunity and purpose." Social co-operation must be voluntary in order to be effective; it crumbles under compulsion.

Our Institute does Effective Work

I wish to commend your association in maintaining such a splendid and useful institution as the American Institute of Baking. I recently visited this institution and was agreeably surprised to learn first hand the efficient work it is doing. I learned that your industry is determined to procure, through scientific and practical investigations by competent investigators, the very best methods of manufacturing fuel, wholesome and uniform food products at the minimum cost compatible with maximum quality. This institution, I also learned, provides a school where students can obtain a scientific and practical training in the art of baking.

The Department of Agriculture, which I have the honor to represent, is a great fact-finding institution, created and maintained by taxes collected from all the

people, either directly or indirectly, of the United States. It therefore belongs to the people and its facts obtained are theirs. The department will give hearty co-operation to your industry, or any industry or agency which seeks to promote the welfare of the nation and thus add to the contentment and happiness of its citizens.

Still More Toast

WHEN an editorial in a trade paper characterizes the Toast Campaign as a "splash" without lasting value, it is heartening to see the same day three other opinions.

Another trade paper says editorially:

"Broiled ham between slices of freshly toasted bread has probably doubled the consumption of bread for the habitués of the place."

Now a manufacturer of a heavy duty toaster especially designed for the sandwich shop volunteers the information that "Our business for the first six months of 1925 was double that received during the same period of 1924."

One of the most successful and best known of the sandwich shops is the B-G chain under the inspired direction of A. H. Buck, its founder. Originating in Kansas City, these restaurants now have their devotees in seventeen cities who depend on the tasty toasted sandwich, pie and two cups of coffee for their afternoon supply of energy. The following is quoted from his letter of October 12th—

"The toast campaign that has been conducted by the Institute, in my mind, has been a splendid thing for the baking industry throughout. There are so many angles to the proposition from our standpoint that I, like yourself, would rather cover them with you in general conversation which I will be delighted to do at the earliest opportunity available."

A Census of Our Industry

WHEN the results of the census of the baking industry were published last winter, two things were at once apparent, the first that the business of baking was a billion-dollar industry which was far up in front in the list of major food industries, the second that the housewives whom we had pictured as no longer slaves to the bread pan and bake oven were still buying and baking more than fifty per cent of the annual output of the flour mills.

The census showed the baker that he had still a long way to go in putting his products into every home and that he should be far more concerned over developing plans to capture the great home market than in any competition from neighborhood bakers or city-wide wholesalers.

Another census is now being planned by the Bureau of the Census and in taking it the Department of Commerce, under the leadership of Herbert Hoover, is urging the co-operation of every business man and manufacturer.

The schedules used in 1923 were revised to meet the needs of the baking industry and when the final results were tabulated almost 20,000 bakers had made use of them. The schedules for the coming census have been simplified somewhat but without eliminating any essential data and will be mailed the first week in January. Of course the value of any census is determined by the completeness of the survey and it is the hope of Dr. Steuart, director of the Bureau of the Census, and of Mr. Hoover that the baking industry will be prompt in mailing back its schedules. Such action will save the expense of sending special agents to each delinquent baker and will make it possible for the final report to be given out at an early date. The bureau has agreed to tabulate the data as rapidly as the

schedules are received and to publish it as soon as the last report is in, first by industries and later by geographical location.

With the co-operation of every baker it will be possible to show the very rapid progress the industry has made in the last two years and it may be that the final results will lift the baker into first place among the manufacturers of our essential foods.

Our Friends, the Writers

No feature of the daily paper is more generally read than the short column which tells some story of health and disease, which shows seekers for beauty where it may be found, which tells tired trained, which suggests diets for anxious stouts and for discouraged leans and which sanely and quietly molds dietary habits, discourages fads, builds up faith in science.

Many editors of these columns have a sound reputation for saneness and real knowledge. That they have been freely using the material from our laboratories which Baking Technology is telling month by month is a source of much gratification to us. The baking industry still fails to appreciate the value of the sound discussion of bread and bakers which day after day is brought to the attention of millions of readers. The worth of well phrased advertisements in stimulating sales is fully recognized and a line on the advertising pages of our great dailies has a definite value. Who can estimate the value of the columns of appreciative reference to the modern loaf which the institute is furnishing to our editorial friends?

No one **makes** a product at a profit. He can only **sell** it for a profit.

Hartley.

Bread Is Still the Staff of Life

Experiments of Scientific Investigators Show Bakers' White Bread Maintains Its Place as an Important Food

By PROF. R. HARCOURT*

Professor Agricultural Chemistry, Ontario Agricultural College

BREAD continues to occupy its important place in our diet. It has maintained, if it has not increased, its popularity as the years have passed. The reasons for this are not hard to find, for it is one of the cheapest foods on the market; it is easily served; it has no pronounced flavor and, therefore, can be used day after day without becoming distasteful; it can be easily and almost completely digested and, above all, it is nutritious.

Bread made from the cereal grains and especially from wheat has formed a part of man's food for ages and, perhaps now, more than ever, it is deserving of being called the Staff of Life. In the United States the annual per capita consumption of wheat is placed at 5.8 bushels, or nearly one pound of wheat per person per day. In Canada the latest figures available indicate that we consume nearly twice that amount per capita. Dr. Starling in his book on Feeding the Nation, states that about 35 per cent of the heat units derived from foods consumed in England are from wheat and barley; and Dr. Sherman, Columbia University, New York, estimates that in the temperate zone from 40 to 75 per cent of the total calories are furnished by cereals and breads. These figures indicate something of the importance of the industry in which you men are interested, and it

should be a matter of pride to realize the important part the baking industry is taking in assisting to provide food for the nations.

Bread Very Nutritious

As stated above, one of the reasons why bread is so important an article of food is because it is so nutritious. It contains all of the essentials for life. Unfortunately it does not contain these in the right proportion to satisfy all the requirements of the human body. It is not a perfect food any more than the other foods we use. The only perfect food is mother's milk for the young and growing animal, but even this does not provide all that is required for the adult animal. Milk does contain protein, fat, carbohydrates, mineral matter and vitamins, so does white bread and many other foods, but none of them are complete in themselves. Variety is necessary, and, furthermore, that variety must be properly chosen. We now know that no food carries a protein that when broken down in the process of digestion supplies all the parts required to form muscle in the body, some little part is missing. Hence, the need of variety in our diet that we may get all the parts required to form muscle. More recently investigations have shown that we also need variety to secure the kinds and amounts of vitamins necessary for full nutrition. Practice, or custom, is often far ahead of science, and we are only now getting the explanation of why bread and milk or oatmeal and milk are so satisfying, and also why leafy vegetables are an essential part of our diet.

*Prof. R. Harcourt is on the staff of the Ontario Agricultural College at Guelph, Ont., and gave this paper before the annual Convention of the Bread and Cake Bakers' Association of Canada at Winnipeg in August.

From Canadian Baker and Confectioner, October, 1925.

Some Interesting Experiments

Last year the Medical Research Council of the British government issued a report on the present state of knowledge of vitamins, or what are sometimes called accessory food factors. In this report Professor Mellanby shows that as a result of long continued experiments with puppies, oatmeal, when used alone, produced very bad rickets; whole wheat flour, bad rickets; unpolished rice, rickets; and white flour, some rickets. Thus oatmeal when fed alone produced the worst cases of rickets, with whole wheat flour the next; and white flour the least. Mellanby insists that in order to prevent rickets, antirichitic vitamins are essential. This vitamin is now known as vitamin D, closely associated with the substance known as fat soluble vitamin A, which is found in green leaves of plants, milk and in a concentrated form in butter, yolk of eggs, and certain fish oils. The availability of the mineral matter, particularly calcium, which is found most abundantly in milk and leafy vegetables, is also due in no small measure to vitamin A. It is worthy of note that when oatmeal was used alone rickets developed, but when milk was added to the oatmeal there was no development of rickets. The combining of milk with white bread produced similar results. These are old standard combinations that have been used with good results for ages.

Food Combinations Necessary

Investigations regarding the influence of white bread on the formation of enamel on teeth, or the decay of teeth, tell the same story of the need of a combination of foods.

It is impossible at this time to go more fully into the scientific evidence on these points, or into the still more recent investigations regarding the curative effects of sunlight. The point I want to bring

out is that no food is complete in itself and that more attention should be given to the proper combination of such foods as will fully supply the needs of the body.

White bread is more criticized than other foods; perhaps because it forms such a large part of the diet. Possibly, also, because in discussing nutritional problems, it is quite correctly stated that the bolted white flour does not contain as much of the mineral matter and vitamins as the whole wheat, but the point that is overlooked is that the difference is not great. Investigators have freely stated the scientific fact and others have jumped to the conclusion that the use of whole wheat bread would overcome all our nutritional problems. The remedy is not to dispense with white bread and use the whole wheat products, for it is not a complete food, but to use the proper combination of foods. This is not difficult, as milk and vegetables of the leafy type will make good the mineral deficiency and the vitamin deficiencies.

Milk Not An Expensive Food

A point that may well be brought out here is that milk is not an expensive food, as many seem to think. At ten cents a quart, it is a cheaper source of energy than many of the foods commonly purchased. In view of its mineral and vitamin value it is almost indispensable, especially where there are children to feed. Too often the main part of the diet in our homes is made up of muscle meat, root vegetables, sugar, along with white bread. Milk and leafy vegetables along with these will vastly improve the diet. If this combination is maintained there is no reason why white bread should not be used if it is preferred to the whole wheat product. On the other hand, if whole wheat bread is preferred, there is no reason why it should not be used, but always with the same combination of foods,

provided it has no ill effects on the system. The point I want to emphasize is that while modern investigations of wheat and wheat flours demonstrate that white flour is not a complete food, neither do they prove that whole wheat flour has much greater value, unless it is to aid peristaltic action. If for any reason we are reduced to one food and a choice is to be made between whole wheat bread and bread from white flour, it would be best to use the former; but that we should discard bread made from white flour as useless, or unwholesome, is a fallacy which I have brought before this meeting on former occasions. The old biblical saying that man cannot live by bread alone is as true today as of old.

Special Sandwiches

A recent investigation showed that almost twice as many people now eat raisin bread toast as two years ago. Many restaurants, coffee shops, cafeterias and tea rooms have built a reputation on this one food. One of the best ways of doing this is by making a specialty of it. This was done by a Pennsylvania coffee shop. They serve it with a special spread that is made from a paste of pecans, maraschino cherries and a little honey to sweeten.

I have read the review of the conventions of the American Bakers Association which Bakers Weekly published, with a great deal of interest. I first attended a convention of this now great association in New York in 1906. A great many changes have taken place in the industry since that time and it is surely interesting to look back and note the wonderful progress we have made. Let's hope we will keep step with progress so that a few years ahead we can look back with real pleasure at the accomplishments of today.

Louis Storek, Storek Baking Co.

An Appreciative Member

We thank you heartily for the bread scoring service you are rendering to your members. We had not fully realized its value until we received your report on the loaf of bread which we sent you for examination. Of course we were disappointed that the score was not higher. We thought we had a very good loaf of bread but it is apparent that there is still room for improvement. If we call on you too frequently for help please call us to account. We believe in the old adage, "If at first you don't succeed try, try again."

I have read with great interest the announcement of the new fund for nutritional education which has just been made possible in the American Institute of Baking. As I read it I recalled the conversation we had at the University of Chicago, concerning the way in which the American Home Economics Association might be called upon to sponsor nutritional investigations in the fields of interest to the Institute of Baking, with the possibility that from such investigations there might proceed valuable teaching materials for high schools and colleges.

I congratulate you upon the opportunity for disinterested and valuable service made possible by this grant.

Emma Dollinger.

We are more than interested in the twenty-eighth annual report of American Bakers Association. It is needless to say that we are in hearty accord with everything that is being done. When one thinks of what has been accomplished in the past ten years and realizes that the business of baking, one of the most scientific, is gradually developing into a more and more unified industry, we cannot help but look forward to even greater prosperity in the years ahead.

P. A. Heimlich, Eau Claire Baking Co.

Books for the Baking Laboratory

HOW TO PLAN A CONVENTION, by P. G. B. Morriss, The Drake Publishing Co., Chicago, Ill., 1925, 153 pages.

The planning of conventions, big or little, has become a part of the annual duty of association executives.

The number of conventions held in this country every year runs into the thousands, Chicago alone having entertained 762 of them last year, with a total attendance of 650,000. Any book, therefore, which assists the president and secretary of an association to manage more easily the annual or semi-annual gathering of their members will be valuable. Such a book is the one just published by Mr. Morriss of the Drake Hotel. It contains information and suggestions on a multitude of details which seem to perplex the majority of state and district association officers, or which escape them entirely.

The first few chapters are devoted to conventions in general and discuss the objects and principles which govern all meetings. In the baking industry the rotation of officers in state and district association divisions is fortunately giving way to the more stable practice of retaining a permanent paid secretary whose growing experience in convention management is marked by the improved value of his meetings to the industry in that section.

These officers will appreciate the careful tabulation of details which are found in chapter four, entitled "Convention Control." The importance of selecting the personnel of committees with regard to their fitness for the work they are to do is a point which more executives could well study. Morriss has devoted sixty pages to an interesting exposition of the duties of each committee and the different ways in which they contribute to the success of the convention.

Those whose duty takes them to many conventions will recognize the truth of his statement that "the program must be built with a conscious effort toward climax, and avoidance of anti-climax. Many a time has a convention suffered severely through a falling off of interest during or prior to the closing sessions—an example of the dangers of anti-climax." He says further "The convention ought to be so carefully planned, so far as details are concerned, and the clerical staff so organized to take care of them, that it seems to run itself. A convention so organized will not require a lot of chasing around at the time

of the convention by the paid staff of the organization. If their work is properly done they will seem to have very little to do during the meeting."

The presiding officer and his work come in for special comment, because poor handling of his duties will ruin the best plans of his program committee.

Bakery association secretaries will find chapter ten, "The Troubles of Jones," a most amusing story of convention mistakes and may recall some of the uncomfortable incidents among their own experiences. Altogether, the subject of conventions is very well handled and this little book is recommended as another bit of convention insurance for those who must take that responsibility.

—L. A. R.

Abstracts of Technical Articles

Selected for Baking Technology from Chemical Abstracts

Lactated flours and rickets. R. Lecoq. J. Pharm. Chim. (8), 1, 49-52 (1925).—Feeding experiments on rats with homogeneous lactated flours (not mixtures with milk powder) prepared with H_2O produced steady although slow growth, and no symptoms of rickets were noted. With this agrees the chemical composition of 4 samples used: Phosphorous 132-187 mg. per 100; Ca 85-136 mg.; P:Ca 1.29-1.68. Applied to infants, lactated flours prepared with H_2O should be excluded from the diet of normal children, except in special cases, e. g. when milk is not supported. Lactated flours boiled in milk are excellent infant food.

S. Waldbott.

The correlation of the protein content of hard red spring wheat with physical qualities and baking quality. C. E. Mangels and T. Sander-son. Cereal Chem. 2, 107-12 (1925).—No significant correlation is found between the protein content of wheat and the test weight per bushel. A significant positive correlation was found between protein content and the percentage of dark, hard kernels in 1922 and 1924, and a slight positive correlation in 1923. A significant positive correlation was found between the protein content of the flour and the loaf volume for the three crop years 1921-1923. All these conclusions are based on wheat grown in North Dakota.

R. Buchanan.

Wheat and flour studies. I. Proteolytic enzymes of flour. 1. Auto-digestion of flour milled from frozen and non-frozen wheat harvested at various stages of maturity. P. F. Sharp and Roma Elmer. *Cereal Chem.* 1, 83-106 (1924); cf. C. A. 19, 1459.—Analysis of protein fractions of flour milled from wheat at various stages of growth indicates no change in the glutenin, an increase in the gliadin, and a decrease in the 5% K_2SO_4 solution and amino N as the kernel develops. Subjection of immature wheat to freezing temperature had no effect on protein fractions as compared to normal wheat. The total protein of the flour milled from wheat harvested at various stages of maturity did not differ greatly, although a slight decrease followed by an increase is indicated. Proteolytic enzymes digest flour protein if given sufficient time to act. Auto-digestion of flour over a considerable period of time produces no decrease in the glutenin, in increase in the 5% K_2SO_4 -solution and amino N fractions and causes a decrease in the gliadin. Freezing apparently affected the proteolytic activity very little, if at all.

R. Buchanan.

Glutenin—a simple method for its preparation and direct determination. M. J. Blish and R. M. Sandstedt. *Cereal Chem.* 2, 57-67 (1925).—Weigh 8 grams flour into a 200 cc. flask, add 50 cc. H_2O and mix thoroughly. Add 5 cc. N NaOH, vigorously rotating the contents of the flask. Shake the mixture at intervals of 10 minutes for 1 hour. Add acetone-free MeOH in 50-cc. portions, until the 200-cc. mark is reached, shaking after each addition, and finally add 5 cc. in excess. Allow the starch to settle, decant the solution through a cotton plug. Pipet 50 cc. into a 100-cc. Erlenmeyer flask, add a few drops of thymol blue. Precipitate the glutenin by adding 0.2 N HCl from a buret, with constant shaking, until a complete color change occurs, then 1 or 2 more drops of acid until a light olive color is obtained. Allow the mixture to stand 1 hour, then pour the contents of the flask into a 100-cc. centrifuge tube and centrifuge 10 minutes. Pour off the clear liquid; add a little distilled H_2O to the glutenin remaining in tube and pour into a Kjeldahl flask and determine N in the usual manner. N times 5.7 gives the glutenin. Possible variations of method and reasons for the details above are given.

R. Buchanan.

Detection of benzyl peroxide in flour. F. Kirchhof, O. Luning and S. Rothenfusser. *Chem. Ztg.* 49, 535 (1925).—Discussion of experimental details and of the delicacy of R's test for $(BzO)_2$ (cf. C. A. 19, 1740).

H. W. Vahlteich.

Nutrition studies in a Berlin orphan asylum, with particular reference to calcium metabolism. E. Rost, O. Herbst and A. Weitzel. *Arb. Reichsgesundh.* 53, 543-61 (1923); *Expt. Sta. Record* 52,160.—The purpose was to determine whether Ca retention in boys about 13 years of age could be increased by the addition of a Ca salt to a diet already fairly rich in Ca. The experimental diet furnished 63 grams of protein, 44 grams of fat and about 2,258 calories, representing 1.99 grams protein, 1.3 grams fat, and 68 calories per kilogram of body weight. The Ca content of the diet was equivalent to 1.52 grams of CaO daily. This was supplemented during the main period with 3.6 grams daily of Ca lactate, furnishing about 0.77 grams of CaO. The results indicate that, on a diet furnishing as much Ca as that of the present, nothing is to be gained by supplementing the diet still further with Ca salts.

H. G.

Determination of the total solids of bread.

Raymond Hertwig and L. H. Bailey. *J. Assoc. Official Agr. Chem.* 8, 585-91 (1925).—The following is suggested in place of the present tentative A. O. A. C. method: Weigh the whole loaf, cut into slices 2-3 mm. thick, spread out to dry in a warm room (approximately 15-20 hours); weigh again, grind to pass a 20-mesh sieve, mix well, keep in airtight container, and determine per cent total solids on the ground sample by drying 2 grams for 5 hours at 98-100 degrees in a vacuum oven at an absolute pressure of not over 25 mm. of Hg absolute, or for 3 hours at 112-7 degrees at atmospheric pressure. Grinding to pass 40-mesh sieve may result in loss of H_2O , but no loss occurs in grinding to pass 20-mesh sieve if the bread is in equilibrium with the atmospheric humidity. Drying 3 hours at 112-7 degrees at atmospheric pressure causes only slight darkening of the bread, and gives results practically identical with those of vacuum drying. Drying at 130 degrees for as little as 30 minutes causes marked darkening. Loosely covered dishes should be used (cf. C. A. 18, 3235).

A. Papineau-Couture.

A Page on Pie

*How the Thompson Pure Food Restaurants Stimulate the Pie Appetite
of Their Patrons*

EVERY intelligent effort to recall the insatiable desire for more pie which is a cherished memory of every boy who knew the joys of a real home kitchen is a help to the baker of commercial pies.

There are many reasons why pie should again come to be the glorious finale to every well-designed meal. And the famous chain of restaurants which is operated by the John R. Thompson Company has summed up the virtues of pie in a sentence, "If you don't like pie you ought to be examined by a specialist to see what's the matter with you." The rest of the argument for more pies is so logically enticing that every baker, no matter whether he sells pies to restaurants or not, should commit this appetite appealing advertisement to memory.

"I was brought up on a farm. In our locality, we raised corn, oats, thistles, mortgages and pies. And the pies my mother fashioned were so good that they made up for any discomforts caused by early rising in zero weather, dressing in cold bedrooms, lack of the latest city styles and lack of money. Those pies were never flat, never soggy, never dry—they were poems, gastronomic symphonies, and because my mother never let me eat more than three pieces at a sitting, I never got enough.

"For fifteen years I looked high and low in Chicago for good pie. I tried the staple foundry article in the lunchrooms and I tried the rich concoctions in the lobster palaces where if they did the thing up right they'd serve you a digestive tablet with each piece instead of cheese. But in all these years I never found a pie that even approached the simple, juicy, luscious, soul-delighting

pies of my boyhood days—until I dropped into a Thompson restaurant.

"I'd read about the eight-story, white-tiled daylight Thompson Commissary, the most perfectly appointed commissary building in the world, which contained the famous daylight bakeshop and pie bakery. I'd read about the pure leaf lard and creamery butter that were used to make Thompson's pies tasty and toothsome—but I read those statements with a good deal of skepticism—until I ate a piece of Thompson's pie. I wouldn't eat any other kind after that.

The pies that I get now at Thompson's restaurants, apple, custard, cherry, rhubarb, lemon cream, blueberry, raisin, peach, pineapple, pumpkin and cocoanut cream—are almost as good as I used to get as a barefoot boy in Mother's old farm kitchen. They're so far ahead of anything I ever had before in a public restaurant that there's simply no comparison.

"If you like pie—and if you don't you ought to be examined by a specialist to see what's the matter with you—step into one of Thompson's restaurants, try a piece of Thompson's home-made pie with a glass of pure country milk, and see if I'm not right."

Good business sense ordains that we should capitalize upon the knowledge which we possess. And, since we know so much about our products, infinitely more than the great majority of consumers, should we not devise ways and means whereby we may constantly herald to the world the value of mankind's first and foremost food fundamentals—bread and meat?

Meyers.

BAKING TECHNOLOGY

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Applied Science
in Baking*



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Bread or Expensive Potatoes

FOR the next eight months, potatoes, the chief carbohydrate competitor of bread, will cost twice as much as bread on the family dinner table. The requirements of sound nutrition and the need for building an adequate dietary at a minimum expense, stress the importance of telling the hungry world that bread is a better food than potatoes, that today bread costs but half as much as potatoes, that bread can be

used instead of potatoes at every meal and in every way in which potatoes have formed the chief vegetable component of the diet.

The potato crop for 1925 is more than

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increase the consumption of other carbohydrate foods, most of which are decidedly better than the potato itself. While the potato is our most important vegetable food, it has not been in general use

one hundred million bushels less than the 1924 crop and over seventy million bushels below the average yearly production for the last five years. This unusual shortage has naturally forced potato prices to high levels which undoubtedly will not be lowered until another crop season.

This situation, however, will not seriously affect the nutrition of our people. The only tendency will be to

for more than a few centuries. The human family has been well nourished by the cereal grains for thousands of years. If through a potato shortage and consequent high prices, it temporarily abandons the use of its best liked vegetable no harm will result.

Bread Best and Cheapest

Rosecoe H. Shaw of the Department of Nutrition of American Institute of Baking, points out that the potato has always been regarded as one of the cheaper foods, and for many years has constituted an important part of the diet of the poorer classes. Frequently however, for one reason or another, the price of the potato has risen to the point where it is beyond the reach of the poor and has become a luxury even for those of moderate means. This is the situation today and so it is of interest to compare the cost and nutritional value of potatoes with bread. The conventional way of comparing two foods is by their total energy value. In this light one pound of bread will yield 1200 calories while the same amount of potato gives about 380 calories in energy value. Bread then has more than three times the energy value, pound for pound, as potatoes. Just now potatoes are retailing for 5 cents per pound. As usually prepared, the edible part of the potato is from 80 to 85 per cent of the whole which makes the price of the part that is used, not far from 6 cents per pound. The retail price of bread at the same stores is never more than 10 cents per pound and often it is less. There is no waste to bread—it is eaten to the last crumb. A simple calculation shows that 1 cent will purchase 120 bread calories while the same amount of money will purchase only 63 potato calories. In other words, just now potatoes cost about twice as much as bread when their energy value is taken into consideration.

The potato is a carbohydrate food, being chiefly starch and water, while bread although sometimes considered a carbohydrate food, is really much more than that for it contains a very considerable percentage of protein and fat. Potato starch and wheat starch have equal food value and their place in the diet is to furnish heat and energy.

Potato Proteins Inferior for Growth

Of the 1200 calories in a pound of bread about 170 come from the protein. The wheat proteins are among the most easily and completely digested in all fooddom and those of the milk which are found in the average loaf, take first rank. Of the 380 calories in one pound of potatoes, about 40 come from proteins but the proteins of the potato are somewhat inferior to those of wheat and milk; in fact one investigator states: "Only about 70 per cent of the protein present (in potatoes) is true protein, that is, of a character such as can be used to build and repair tissues." Moreover, it has been found that from 8 to 25 per cent of this protein is lost as the potato is usually cooked. With these facts before us, a little calculation will show that from the protein standpoint the potato has only about one-eighth the value of white bread.

The potato is woefully deficient in fat, for while white bread contributes about 120 fat calories per pound, the potato yields less than 5.

Potatoes Low in Minerals

Lime is a most valuable constituent of food and one which is frequently found in inadequate amounts. Milk bread, that is bread which contains one-third of its liquid ingredient as whole milk, contains 0.0112 ounces of lime per pound, while the same quantity of potato has but 0.0032 ounces, less than one-third as much as bread.

From the vitamin standpoint perhaps

there is little choice between the two articles of food as neither furnish more than small amounts of these important food accessories. Bread is however the means by which the vitamin rich butter is carried into consumption.

Protein is the most expensive constituent of our food, the next in rank is the fat, and finally the cheapest is the carbohydrates. The potato is a most excellent heat and energy food. It may also be considered as a fair source of vitamins, but that is all. It contains a negligible amount of fat and of mineral salts; its protein is low in quantity and poor in quality. At the present time we are paying twice as much for potatoes, from the caloric standpoint, as for bread, although milk bread is a much better balanced food in that it contains a larger proportion of proteins and fat to the carbohydrates.

Potatoes Require Cooking

Then, too, potatoes cannot be eaten in their raw state. They must be scrubbed, washed, peeled, cooked and prepared for placing on the table. Bread, on the other hand, needs only to be sliced before serving. This fact alone justifies the lessened use of potatoes in many homes where the labor of food preparation adds additional burdens to housewives and mothers.

Jean K. Rich, of the new Department of Nutritional Education of the Institute, has pointed out in her discussion of the broad subject of family feeding that there are several important things to be taken into account in the preparation of every meal. The subject of first importance is, of course, the serving of an adequate amount of food, wisely chosen in order that the nutritional balance may be secured. The same foods are not adapted for every member of the family. Little children cannot properly assimilate the foods nature intended for adults, and persons of sedentary occupation and the aged

do not require foods full of driving energy.

Nature's laws, which have never yet been successfully amended, require in their observation an intelligent appreciation of the fact that the value of a meal is determined by more than its calory content. It will be the purpose of the Department of Nutritional Education to show how every meal for all types and classes of people should be so chosen that children in school will be fully fed for maximum bodily and mental development; how adults at work may best obtain all the food essentials which through the intricate chemical processes in the laboratory of the body do the work of the world, and how mothers of little children and of generations yet unborn can, by proper food selection, contribute to the building of a stronger race.

How does this ambitious program relate itself to potatoes? The answer is simple, and in the months to come will be more intelligently worked out than ever has been possible before. If in an endeavor to find in the contents of the family pocketbook sufficient funds for the family food supply, cheap bread, nutritionally well balanced, desirable of flavor, palatable and digestible, is substituted for the starchy potato at a great saving of money and of labor and with the resultant improvement of the nutritional balance of every meal, the failure of the potato crop will prove to be a blessing to the American people.

We have found your publication of service more than once in the past couple of months, and would consider it a great favor on your part to put our name on your mailing list. Many publications have done so, but we know your publication would rank very high in the service so rendered.

Olmstead, Perrin & Leffingwell, Inc.

A Deserved Rebuke

AMERICAN INSTITUTE OF BAKING was created for the purpose of putting science behind bakers' products.

In the six years of its work it has made marked progress toward its goal. But the value of science is still unappreciated and often scorned by those who should welcome and support it. During the past summer chemists and laboratories in flour mills and bakeries have been ridiculed and the value of their work belittled. Strong supporters have now come to their defense. The current issue of *Industrial and Engineering Chemistry* tells the whole story in an editorial which is here quoted in full.

"Daylight is the name of a house organ with a guaranteed monthly circulation of thirty thousand copies, issued on behalf of the J. H. Day Company of Cincinnati. It is sent free of charge to any baker in the United States who requests it. In October, Daylight, by reprinting on its editorial page a story credited to the *Retail Baker*, gave its sanction to the sentiments expressed therein and was accordingly placed in what should be a most embarrassing position.

The *Retail Baker* in its July 10 issue printed the following:

Chemist! For What?

"Millers of flour, when they have established a chemical laboratory under the direction of a professor of chemistry, seem to think they have accomplished wonders. Maybe they have, but we fail to see it in that light. The millers send out literature telling all about their chemists and new laboratories, thinking, we presume, thereby to impress the bakers.

"Now, let us think from the bakers' viewpoint. 'Chemist! What for? Why does a miller need a chemist and a laboratory? Does he want to cheapen his product while keeping up appearances?'

"Such questions run through the bakers' minds. Chemists are not employed by millers to find 'purity' in the wheat. The good Lord takes care of that.

"Then why are they there? The only parallel we can draw happened in pre-Volstead days. A certain large beer brewery owner found that a chemist-brew master in another brewery could make beer for ten cents a barrel less than his own cost of production, and promptly bid so high that he secured his services.

"He had the chemist, and no one, especially a baker, can be convinced that better products can be made at a cheaper price, so the logical conclusion is that both price and quality were reduced.

"This is exactly what the baker thinks when he reads the millers' letters about chemists and laboratories."

This editor fails to distinguish between purity and quality. A product may be unadulterated and yet worthless. Chemistry is useful to produce not only the same material at a lower price, but at the same price an intrinsically better product.

On July 17 the first outburst was followed by this one:

"Are the modern day bakeries about to be converted into chemical laboratories? It would seem so to the layman, were he to read the letters some millers send out, proclaiming to all the news that they have employed chemists in their flour mills. The wholesale bakers maintain chemical laboratories; about everything, it seems, is to be made according to chemical processes. But to what end?

"Is bakers' bread any better today than it was, let's say, about twenty years ago? If you ask us we will not hesitate to say it isn't.

"Many, no doubt, will dispute this assertion, but it seems to be borne out by facts, as viz.: Two decades ago the big cities were dotted with bakeries such as the 'National' and 'Home & Hutton's.' These bakeries always had their show windows piled high with good wholesome bread which people eagerly sought. They used simple formulas, good flour from flour mills, and not chemical laboratories, and sold thousands of loaves of bread. It may not have been as nourishing, but even that we are prepared to dispute, as people as a rule, are not healthier today than they were then.

"The chemical laboratory, as applied to flour and bread, will sooner or later become a flareback, and it is to be avoided."

We would call your especial attention to the second brief paragraph. Evidently the Retail Baker, a trade journal, does not believe the trade it serves has made progress in twenty years. We do not believe the majority of bakers are in agreement with that statement.

The third effort in this direction was the one reprinted by Daylight:

Bakers and Laboratories

"The letter from a correspondent who signed himself 'R. G. S.' in last week's forum spurs us to write more about bakers and laboratories. While we are not at all opposed to laboratories in bakeries for the purpose of determining the quality of ingredients, we see no good reason why they should be exploited to the public.

"A laboratory, to the general public, means chemicals, and when people want chemicals they go to an apothecary shop.

"The mere mention of laboratory, chemical analysis, etc., immediately suggests chemicals—drugs—and people have visions of near-bread as they have of near-beer and such other things which are only the cheapest kind of imitations ridiculed by the majority.

"Laboratories, chemicals, and rats have no place in the advertising and publicity of the baking industry.

"Less laboratory publicity and more 'better bread' advertising will considerably help the baking industry."

A host of instances could be cited to show that the better bread which must be baked as well as advertised, is due to the application of scientific work, evidently not comprehended and probably not carefully studied by those responsible for the foregoing quotations. These gentlemen fail to appreciate that the modern laboratory is in no way associated with drug stores. They have not understood the growing interest and knowledge on the part of the public in scientific work and its intimate relation to their everyday life. To the public the laboratory stands between them and deception. It makes possible a guarantee of wholesomeness and quality impossible in these days with-

out technical advice. The use of guinea pigs, mice, rats, and other of the lower animals to determine nutrition and establish preliminary data as to the influence of various food factors on growth and body repair is accepted as an indispensable technic and more greatly to be desired than the careless use of the public for the same purpose by food manufacturers of an older generation. Consumers can be made to understand the importance of scientific work as employed by their baker, and such organizations as the Continental Baking Corporation recognize the place of science in the production of flour and its products. Their recent brochure on "The Story of Bread" is ample proof of their reliance upon chemistry.

These editorials seek to place chemistry in a false position and may be cited by some to offset the excellent work being done by the American Bakers Association through the American Institute of Baking. They may also do an injustice to the many individual bakers who are honestly striving to give the public the best possible product.

So long as there are editors who hold such untenable points of view as those portrayed by the editors of the Retail Baker and Daylight, important educational work remains to be done."

—From *Industrial and Engineering Chemistry*,
Vol. 17, No. 12, Dec. 1925.

"We are particularly interested in Baking Technology. It is a publication that forms most excellent reading because the matter you are serving up is of fundamental interest to anybody keenly interested in the baking trade."

—The United Yeast Co., Ltd., London.

The first baker who took back bread must have had a full heart and an empty head.
Stude.

BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

H. E. BARNARD, Editor

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We Work Together

To win through knowing our markets and developing their full potential possibilities, a higher place for the baking industry in the great family of America's business life.

"Independent Air Force"

WE HAVE become proponents of the Army, the Navy, or we personally approve of a separate Air Force, depending upon which side of the Washington publicity we are most interested in. That all three are necessary in modern warfare we all agree.

In some respects the baking industry might well be likened to these three branches of our national defense. And our industry is waging a constant warfare—offensive or defensive—for better public health. Some bakers belong to the Navy; some to the Army; some may be classified as Marines, with qualifications in both branches, and looking for trouble where it is hottest; and then there are the Air Forces which have been sent out from the Association and Institute to reconnoitre the territory, to bring back the information from distant camps, to bomb out of their shelters the propagandists and the food faddists.

But we have been in somewhat the same position as our War Departments: there hasn't always been the best of correlation between the three arms of our industrial defense. Jealousies have existed, misunderstandings have occurred, and we have not always appreciated just how the other branches of our industry were functioning for the good of the cause.

But now we are ready to centralize all of these different lines under one great Association. The Board of Governors in their last meeting laid a foundation for the whole industry, so broad in scope, yet so accurate in its divisions, that every single baker in the industry can fight for a better business under the common banner of American Bakers Association, and know that every other member stands ready to help him in his defense of baker's products.

The Headquarters staff in the American Institute of Baking will see that every section of the industry: wholesale, retail, house to house, pie bakers, cake bakers, production managers, advertising managers, and salesmen will be supplied with plans, instructions and materials for their own offensive—so long as their company stays in the line of duty.

The separation of the Institute and Association make it possible to develop, more effectively than heretofore, those prerogatives which belong primarily to the Trade Association for the immediate benefit of its own members.

The Institute, on the other hand, now goes before the world carrying in an open book the truths about the superior health values of the baker's products, without trace or taint of commercial propaganda. The essential service of the Signal Corps is pledged by the Trade Journals, and the Quartermaster's Corps, that service of supplies, will bring the Allied Trades the recognition they deserve. There is an Officer's

Commission, or private's place, for every person in the industry.

May the coming year see the mobilization of this great Organization of the Baking Industry.

L. A. RUMSEY,

Secretary, American Bakers Association.

Neither Law nor Ethics

THE changes which have taken place in the baking industry are almost revolutionary. Conditions which have been stable for generations have been upset in the past five years. The lines between wholesale manufacturers and retailers are more sharply drawn than ever before. The production of many staple bakery products is now so fully specialized that better bread, cakes and pies are being turned out by factory processes than were ever developed by hand labor at the bench.

But the success of the specialists in bakery production offers no menace to the retail baker. It may be difficult for him to see how the rapid development of large units within the baking industry will not injuriously affect his own business. Although the volume of his bread sales is not more than 10 percent of his total business, he may view with alarm the tendency toward lowered bread prices. It is hard for him to introduce changes in his business methods by which he can meet the keener competition of the present day and continue to draw profitable custom to his salesroom.

Of course, the answer to the problem of the baker who fears the effect of keener competition will be the answer which every business man and shop keeper is seeking. It will not be found in restrictive legislation; it has nothing to do with codes of ethics, but it has everything to do with the quality of service rendered. The success of every baker, no matter how large his business or how small the number of

customers he serves, rests upon his ability to manufacture the kind of goods his customer wants. And this service is no longer limited to the putting together of raw materials by craftsman labor. It is a combination of skill in the shop, of salesmanship, of thorough knowledge of the value of bakery products in feeding children and adults, with a business sense which utilizes the opportunity to put a fourth meal in the schoolchild's ration, which sees on the breakfast table a need for more baker's goods and which recognizes the fact that every successful baker, large or small, is helping to increase the business of every other baker who gives an equal service.

If one-tenth the effort which is now wasted in vain attempts to stop the coming of this new era of efficiency in the bakeshop could be directed to the education of every baker to be a more efficient servant in the making of better food for all the people neither restrictive laws nor codes of ethics would be necessary to protect even the smallest baker from the press of competition.

Sampling Flour

EVERY appraisal of values which is based on chemical analyses is accurate only when the samples tested are carefully chosen. One of the most troublesome features of a flour analysis is the difficulty of securing a representative and fair sample of the flour under investigation.

The discussion of methods of sampling flour found on Pages 366 to 368 of this issue of *Baking Technology* is a most important contribution to the science of milling and baking.

The method as proposed is not intended to be final or the last word on the subject. It is, however, a step forward and deserves the attention of all those who realize the importance of an accurate, equitable and practical method for sampling flour.

Public Welfare and Industry

Modern Social and Industrial Life Brings New Interests Into the Home

By MRS. WALTER McNAB MILLER,

Chairman of Public Welfare, General Federation of Women's Clubs

IT is a distinct pleasure to meet the representatives of a great commercial interest like the baking industry which plays so large a part in woman's recognized industry, that of home-making. Its development, its methods and its aims have a definite appeal to her because of the fact that at one time they were of her own special domain and under her control.

Of all organized industries, this one contributes most largely to the welfare of society and intrigues the interest of the club woman and for that reason I am here today to bring you greetings from the General Federation of Women's Clubs, the largest body of organized women in the world, with some 3,000,000 members functioning through local, county, district and state divisions and growing so rapidly that its influence is one with which to reckon.

Its Public Welfare Department, of which I am chairman, concerns itself with questions of modern industry as it affects the home and society, and therefore has a more than passing interest in understanding the baking industry and in interpreting its aims to the women of the country, thus promoting a more cordial co-operation between those who sell and those who buy. As nine-tenths of the buying is now done by women the present development of her relation to the great industries in this capacity, is in marked contrast to her old role of a producer in the home.

Changing Social Order

Woman, herself, has not been responsible for this changing order, though in

bringing about certain changes she has played a conspicuous part. Roughly speaking these changes have been brought about by:

- a. World exploration and migration.
- b. War.
- c. Invention of printing.
- d. Machinery and the industrial revolution, which is evolution rather than revolution.
- e. Economic changes.

World Exploration

The world exploration, through the breaking up of old customs and the free play given to initiative by new conditions and new environment, had a marked effect upon man and an even greater upon woman, as she had become immobile, both physically and mentally. The pioneer days, though hard physically, gave a freedom which produced in America, Australia and New Zealand, a new type of woman and developed a courage which made her pioneer in new fields, seeking "rights" never before even voiced, such as education, political equality and economic freedom. Nowhere is this story more vividly told than in the "Story of a Pioneer" by Anna Howard Shaw, who, in her long life saw the coming of these various changes with their tremendous effect upon society.

War

In the tribal civilizations, sharp distinctions were drawn between the occupations of men and of women. War and the chase being the recognized masculine pursuits; planting, harvesting, preparation

of food, weaving and caring for the home belonged to women. As wars became less frequent, not taking all the time of all the men, fighting devolved upon a few specially trained for this work, while the remainder sought other occupations and finally invaded woman's traditional field until today many of her household tasks are in man's hands.

Prior to the World War, women already had begun to enter many new fields, but the five years of its duration brought so many tremendous changes that those who could read the signs aright, recognized the close of one civilization and the beginning of another in which women were to have a vast influence for the better or for the worse. Another factor in the World War which brought a change to women's outlook was their service with the Food Administration.

"Bread" as an international subject challenged their attention and the effort to readjust their individual lives to meet world needs, brought about a realization of the interdependence of nations which gave a spiritual slant to all their efforts and is reflected in their work today. The war also hastened the political independence of woman, increasing her interest in government as it functions in social welfare. She began to see that a democracy which was not enlightened and highly trained could not endure and in her group studies we find political science holding a leading place.

Invention of Printing

The printing press stimulated a general growth of new ideas resulting in further changes in the old order; and the opening of the educational door to woman enabled her to take advantage of these opportunities for development.

Machinery

Machinery, by taking over so many of the old tasks performed by women in the

home, released many women from toil and produced a so-called leisure class which began looking around for new worlds to conquer and found them, first in the intellectual field, then in the political.

Other women followed their work from the home into the factory giving us the woman in industry where she is still regarded by the unthinking as an incident, and not a permanent factor.

Economic Changes

The drift from rural to urban life, the congested areas with ever increasing land values have brought about great economic changes. The detached house with its garden has been replaced by the flat; the flat by efficiency apartments in which normal family life is difficult, children a problem and old-time domestic processes impossible. The outside commercial agency meets the need created by this social and economic upheaval and society must recognize and adjust to the new conditions.

The Results of the Change

The resulting total of these changes is that today, emphasis is being put upon woman the consumer, or, to be more exact, woman the buyer, rather than upon woman the producer.

This new emphasis and woman's failure to meet its demands, has shown the need of educating her for her new job in such a way that her value to society as a homemaker should not be lost but her old activities translated in terms of the new. In this education for new activities, she must learn to deal with factors never before recognized as pertaining to her work and must include such subjects as transportation as it affects cost of living, marketing, intensive advertising campaigns—which so often confuse real with false values—as well as many others, all calling for a comprehension by women of

their relation to her particular work of running a home efficiently.

One significant change resulting from her new political status, has been her recognition of the increasing extent to which government concerns itself with social welfare and of the power which the vote gave her in promoting legislation to this end. Like most people suddenly granted an increase in power, the uses to which she has put it have not been invariably judicious; but wisdom comes with experience and I think you may trust the future to a group which so earnestly desires to be intelligent, honest and broadminded in its use of the voting privilege as do women.

The federation's first entrance into active legislation was in the Pure Food campaign when they joined forces with persons who were working for an "honest label" on manufactured goods, thus hoping by making misbranding punishable under Federal law, that the food manufactured outside the home and brought to the table as a finished product might give a guarantee of protection to buyer and consumer.

This campaign, followed as it was by the agitation for state laws to conform with the Federal law, quickened woman's interest in national and state activities and awakened her desire for a share in governmental housekeeping. The interest today in the Merrit Misbranding Bill as applied to textiles, is a logical outcome of the Pure Food campaign, and the increased influence wielded by women because of their political recognition, is worthy of note.

Interest Mainly Cultural

For some twenty years after the federation was formed the interests of the clubs were mainly cultural, from that time on their programs show an ever increasing interest in community life. But through

all these changes one underlying note is dominant, the belief that the protection of the individual home and of the community home is the real life-work of woman and that she must fit herself for it. This belief finds its fullest expression in the Departments of Public Welfare and of the American Home.

Department of Public Welfare

The Department of Public Welfare, including as it does the Divisions of Child Welfare, Public Health, Problems of Industry, Problems of Delinquency, Narcotics and Indian Welfare, touches closely all community life and that you may know what women are attempting in this field, may I quickly summarize the programs of the first three which touch your industry at many points.

The Child Welfare and Public Health Divisions are leading in urging a survey of the laws of a community as they affect the health of the people, especially that of children. Food regulation, garbage collection, smoke abatement, housing laws, reporting of contagious diseases, playground facilities, factory regulations, working papers, etc., all come within the extent of the survey. The expense of the outlines for the work and the printing of data collected will be borne by the Metropolitan Life Insurance Company which is giving this generous support to the Federation because of its belief in the value of its educational work. The local clubs initiate the work but secure the co-operation of all agencies,—business, civic, social or official,—in carrying it out, as the object is to interest the whole community in knowing its strength and finding and correcting its weak points.

The Division of Industry is new and its chairman in making out her program has had the assistance of the Federal Department of Commerce, the American Manufacturers Association, the American Fed-

eration of Labor, the Federal Department of Agriculture and the Woman's Bureau of the Department of Labor. If there is wisdom in varied council this program will certainly contain most valuable suggestions and it has already been commented on favorably by leaders in economic thought.

The first program is a brief review of the development of modern industry to give a background for further study. Then programs, three of them are outlined, each bearing on a different phase of the same subject, the Elimination of Waste. The first of these takes up standardization of household utilities, building materials, city building, business documents, etc., using the bulletin of the Bureau of Standards in the Department of Commerce as text.

The next program bears on the waste through production and distribution of agricultural products and covers such topics as waste in livestock industry, plant production, poor soil and man power and one in which special stress is laid on the great loss to the buyer from the poor distribution and wasteful marketing of food.

The last program is of vital importance to society as it deals with causes of unemployment such as inflation and collapse, seasonal intermittency and labor conflicts. Such problems as these can only be solved through a common understanding arrived at through patient study and mutual good will and an appreciation by the general public of their effect upon each individual. An impossible task you say? Well perhaps, but certainly no problem is ever solved by saying "there is no answer".

The American Home

The new department, the American Home, deals even more closely with matters of interest to the Baking Industry

as it includes Home Economics with its sub-division of Nutrition. This department recognizes the fact that the modern home must meet modern needs and demands and therefore cannot be built or run as the home of 25 years ago.

Changing conditions, especially in cities, allow very few families to raise their own vegetables, own their own cow, make their own bread, jellies and jams, but this fact is not yet fully recognized in the education of the girl; so this department is trying to bridge the gap, pending a wider comprehension by the general public.

The same old obligation of the homemaker to see that her children are properly fed, clothed, housed and trained, rests upon her, but the methods vary with the change of life. No longer are women encouraged to make their own bread but are urged to gain a knowledge of how to judge bread for quality and for price.

The schools of modern salesmanship are multiplying and if they are to be judged by the few books I have examined, the underlying motive is to make the "prospective" buy whether he needs the goods or not. One questions the fairness of such advertising methods and the Federation is doing its utmost to create an interest in its members in what to buy, where to buy and how to buy, including instructions in what not to buy, hoping in this way to provide a class of discriminating buyers who can resist the wiles of the tempter.

Baking Industry Helps Home

Fortunately your industry has a product which people want and must have, and there is no other agency, save the dairy, so directly affecting the American home as is the great baking industry. Fortunately, also, your leaders have recognized that clean wholesome bread of high quality pays a sure dividend and are

trying to convince even the small producers in this industry of this fact.

Best of all, and a feature on which I want to congratulate you is the work of your American Institute of Baking, which is bound to be of tremendous value, not only to the baking industry but to the American home. Its research work will give you a sound basis for advertising as well as for improving your product, and I can see a real piece of co-operation between the staff of the institute and the educational group of our Federation.

A Just Reason for Pride

More and more the Federation is realizing that the great industrial groups upon whom all society depends, can do more for the public welfare than any so-called welfare group, if only industry realizes that it exists primarily to serve society and only secondarily for profit. Not that profit should be forgotten, for surely the laborer is worthy of his hire, but there are higher and more permanent satisfactions than money making.

If the women of the country rise up and call you blessed because of what you have done in releasing to them a certain amount of time and energy for mental and spiritual development; if the little children rejoice because they receive, from your hands, bread and not a stone; if the hard-pressed wage earner finds his dollar goes a little farther because in your great organized service you furnish the maximum nourishment for the minimum price, have you not just reason to be proud?

We, the women of this new world, with our desire to fit ourselves for our new job, welcome this spirit in industry and promise you our sympathetic co-operation in promoting an understanding between the new type of industry which bakers so well typify and the new home which it serves.

Fort Dodge Wants More Pie

NOW that there is such a rage for early American furniture and knickknacks, it is only natural that other things reminiscent of what nots and seashells should be returned to favor. We are thinking of pie and as it is quite a while since breakfast and also sometime until lunch, there is fervor in our thoughts. A hotel in New York state recently astounded its patrons by putting pie in assorted varieties on its breakfast bill of fare. They announced that this addition to corn flakes and other breakfast foods was made in order that American traditions may be preserved. Pie for breakfast was a New England idea and those who took up the road to the west long ago are now reviving the old nutritional axiom that a breakfast without pie is no way to start the day.

It would be interesting to trace the derivation of the pie. As strictly an New England offering, it must be of English origin. But the American pie differs greatly today from what is sold under the same name in England. They know not the two-crust pie except as a tart. A real pie would have a thick biscuit top and nothing but fruit underneath, or under the name of pie might be offered a dish of applesauce with a few pastry croutons on top. The fifty-seven varieties which so enliven the American menu are unknown there, the custard, pumpkin, mince, chocolate, burnt sugar, sour cream and other delectable concoctions will not flourish on any other soil. They are the most loyal of subjects.

R. H. Shaw, nutrition expert for American Institute of Baking, has been demonstrating the excellence of the pie as food.

He contends that pie is one of the most delightful as well as most healthful combinations of bread and fruit, or meat, and can be eaten at any or all meals with good results. It is presumed, of course,

that the pie is well made, and it is not suggested that it form the entire meal. Be it ever so good, one can probably eat too much pie.

In Fort Dodge pie needs no advertising. In every restaurant and eating place it is one of the most popular of viands and is one of the first things on the menu of even the smallest of lunch stands. There is something formidable about a row of pies. They look so challenging, but it must be mostly bluff, for they disappear as fast as they appear and no bad results ensue. Even pie for breakfast is not unheard of here.

We might say that pie stages a comeback, if it could be proved that it had ever been away.

The Incorporation of Bread

IN commenting on the marvellous development of a food industry in which machines with arms of steel have lifted the burden of bread baking from women's shoulders the Spartanburg Herald says as it quotes from the New York Times:

"Nothing could better illustrate perhaps the tremendous revolution in human ways and methods of providing for all kinds of wants than what has happened within a generation with reference to bread supply. It is a far cry from the flour-bin in the pantry, the dough-board and home oven to the methods by which the staff of life is supplied to millions of homes. Commenting on the recent great merger of bread-making concerns the New York Times points out some surprising considerations in these paragraphs:

"Bread, according to a recent investigation, supplies one-quarter of the entire motive power for modern human society. That it should have been found to produce a larger number of calories of energizing heat in

the human organism for a smaller expense than other staples sets the seal of science upon an almost universal taste. Even at present prices one cent will buy 57 calories in milk and 63 in bacon, but it will buy 120 in ordinary white bread. Bread is more than a staple food it has become a symbol of life itself. While man cannot live by bread alone, neither can he live without it. This almost mystical concern of the human race for bread makes the recent announcement of a \$400,000,000 corporation to consolidate the three largest bread-making concerns already in existence one of impelling national interest.

"The incorporation of bread has come about just as the incorporation of steel or shoes or oil—except that it has come later and with prodigious speed. The inventions of the traveling oven, the mechanical mixer and wrapper, and other bread-making machines have, in the last ten years, all but ousted labor from the modern baking factory. As each new invention was installed it reduced the cost of production and increased the margin of profit. Efficient management and business strategy used this profit to produce larger plants, more machinery, increased efficiency, better bread and—supplemented by the opportune post-war slump in wheat and further savings through large-scale operations following rapid consolidations—even greater profits. And now bread takes its place as one of the country's great corporate industries.

"All life moving to one measure—
Daily bread, daily bread."

Is now written

"All life moving to one measure,
Baker's bread, baker's bread."

The Sampling of Flour

A Uniform Method for Sampling Flour

THE accurate and trustworthy sampling of any material which is used in baking is of immediate importance to both the manufacturer and the baker. This is especially true of flour, the basic ingredient of bread. At present we have no rapid and trustworthy method of sampling flour which is even generally adopted by either the miller or the baker.

A large proportion of the flour used in this country is sold on the basis of a chemical analysis and baking test. Disputes are frequent, and no matter how satisfactory the analysis or baking test may be to those responsible for them, there is always the chance that disagreeing results may be due to errors in sampling unless recognized precautions have been taken to preclude such a possibility.

The development and study of methods for the analysis of flour has been going on for many years, but in spite of the realization of the importance of the study of methods for obtaining representative samples of flour, little has been done in comparison on this most necessary part of the work. This situation also holds for most other materials used in baking.

The progressive Association of Official Agricultural Chemists, an organization whose personnel comprises most of the Federal and State officials concerned in the inspection and regulatory problems of the pure food and drug law, has recognized the necessity for working out accurate methods for sampling foods and other materials from the legal and practical standpoint.

A committee on sampling was appointed by this Association in 1924 for the purpose of discussing the fundamental problem, with the recommendation that when-

ever possible co-operative arrangements be made by its associate referees with the various industries involved, as well as with the chemists connected with such industries in order to obtain their active co-operation in the development of the most desirable methods of sampling.

The associate referee of this Association, H. Runkel of the U. S. Food and Drug Inspection Station, Minneapolis, Minnesota, in pursuance of the above plan for co-operation, obtained the interest of various organizations in the problem of flour sampling with the appointment of representatives from them as follows:

M. A. Gray, Chief Chemist, Pillsbury Flour Mills, Minneapolis, Minn., representing the Millers' National Federation.

L. R. Olsen, Chief Chemist, International Milling Co., Minneapolis, Minnesota, and D. A. Coleman, U. S. Bureau of Agricultural Economics, Washington, D. C., both representing the American Association of Cereal Chemists.

C. B. Morison, Assistant Director, American Institute of Baking, Chicago, Illinois, and also a member of the Methods Committee of the American Association of Cereal Chemists.

The following statements are incorporated in Mr. Runkel's report presented to the Association of Official Agricultural Chemists at their recent meeting in Washington, October, 1925:

"Through the co-operation of these representatives the viewpoints of the various organizations were obtained. Methods of securing further information were agreed upon. The various types of triers and containers and other similar essential details were considered. The formulation of the proposed tentative method was given careful attention by

each of them and many helpful comments received. Through them and by direct correspondence the officials of the three organizations have given whole-hearted co-operation. The co-operation has been of inestimable value in maintaining a proper balance between theory and practice.

"In addition to the above representatives, and at their suggestions, ten millers, three bakeries, ten commercial exchanges, and three commercial chemists were consulted by correspondence. Their assistance was also highly appreciated and very valuable. They submitted descriptions of methods of sampling in use by the trade at the present time.

"As the various methods in use by the trade were outlined in correspondence and verbally, it became apparent that there was considerable variation in commercial methods of sampling, according to the purpose for which the sample was to be used. While the methods described in most cases had apparently been worked up to suit a particular purpose or the particular needs of an organization, it was evident at once that the variation occurred principally in detail and not in principle. For example, one baking chemist stated that he designates the number of sacks to be sampled from a given number in a lot, that he uses a flour thief for taking samples, that the thief is inserted in the sacks diagonally from the top of the sack, that he uses a tin can as a container. One miller stated that he takes a sample from each twenty-five barrels of flour, one sack from the bottom, one from the top, and one from the middle of the pile, inserting a grain probe diagonally through each sack. Numerous other methods were described, but throughout the descriptions it was noted that more or less consideration was given to the purpose of sampling, to the number

of samples to be drawn, the location of the sacks to be sampled, the method of drawing the sample from the sack and the method of preserving the sample after it was drawn. These points correspond very closely to the six general considerations of the Committee on Sampling and were accordingly made the subject of study. The method as submitted covers each one.

"Mention of some pertinent facts may suggest reasons for some of the principles and details of the proposed method.

"The square root of the number of the sacks in the pile mentioned in the first paragraph of the method has no theoretical significance. It represents about a mean of the opinions of investigators and samplers. The statement is easily remembered.

"Roethe (1) has shown that about half the flour in a 140 pound sack lies in the outer zone one and three-fourths inches wide. Morton (2) has shown and Paul (3) has confirmed the fact that after several days dry storage the flour in the inner zone of a sack contains more moisture than that in the outer zone. Theory would require that the sample consist of a proportion of each zone equivalent to their relative volumes. The nearest balance between theory and practice which could be discovered is incorporated in the method, viz., draw a core from the top corner to the center and another from the other corner half the distance to the center of the sack.

"Numerous preliminary tests were made of various triers. Difficulty was found in removing a complete core. The most adaptable trier appeared to be the one mentioned in the method, which is further described by Roethe (1) as the thirty inch tubular trier. Very simple instructions can be given for its use. As far as could be ascertained it is specially made by a firm in Boston at a cost of

\$15.00. It is used to some extent on Commercial Exchanges (4), in the eastern part of the United States.

"Paul (3) has shown that after a few days' dry storage the sacks in the outer part of a pile of flour contain less moisture than the inner sacks. The sampling in the proportion of 4:3:2:1 sacks from the most to the least exposed portions of the pile agrees for practical purposes with theoretical requirements. The ratio is easily remembered. The sum of the numbers is ten, which makes a simple base for computation.

"The suggestion has been made that these samples all be combined into one composite. In some determinations this is necessary in order to secure a sufficient quantity for the test. This alternative was provided for in the last paragraph of the method.

"Bailey (5) has shown that flour in equilibrium with air at 25° C. and 70% humidity contained 12.05% moisture, but contained 7.92% moisture when subjected to the same temperature at 50% humidity. Morton (2) found that flour should be mixed at approximately 55% relative humidity as at higher or lower humidities marked gains or losses in weight are likely to take place. No data has been found to indicate the speed with which flour takes up or loses moisture. These facts indicate the necessity for speed in transferring the sample to an air-tight container and the necessity for drawing samples from an undisturbed portion of the sack and pile."

The method formulated is as follows:

Directions for Sampling for Chemical Analysis

Sample a number of sacks equivalent to the square root of the number in the lot, but not less than ten, i.e., ten from 100 or less, fifteen from 225, twenty from 400 sacks, etc.

Select the sacks to be sampled according to their exposure in the ratio of four from the most exposed, three from the next least exposed, two

from the next, and one from the least exposed portion of the lot.

From each sack to be sampled, draw a core from one corner of the top diagonally to the center of the sack by means of a cylindrical, pointed, polished steel trier, one-half inch in diameter, with a slit of at least one-third the circumference. Draw a second core from the other top corner to one-half the distance to the center of the sack.

Deliver the two cores at once to a clean, dry, air-tight container which has stood open for a few minutes near the lot of flour to be sampled, and seal immediately. Use a separate container for each sack sampled. Either of the following containers may be used: 1. One pint mason jar. 2. A rubber pouch which can be tied or sealed to exclude moisture or air. 3. A tin can or box with a moisture and air-tight friction top.

Before opening the sample for analysis alternately invert and roll each container twenty-five times or more if necessary to secure an homogeneous mixture. Avoid excessive temperatures and humidities when opening for analysis. Keep the sample tightly sealed at all other times.

For such supplemental determinations as net weight uniformity and baking tests, samples may be increased in number, increased in quantity, or combined to suit the requirements of the analyst, if the principles laid down above are followed.

This new method of sampling flour as recommended by Mr. Runkel of the A. O. A. C. is of immediate interest to the milling and baking industry and will be the subject of future co-operative study by those concerned in order to determine its reliability in actual practice.

The method is now published in *Baking Technology* for the purpose of bringing it to the attention of the baking industry with the suggestion that the American Institute of Baking will appreciate receiving comments and discussions of the method as now formulated.

—C. B. Morison.

REFERENCES

1. J.A.O.A.C. (1925) Vol. VIII, No. 4, p. 224, H. E. Roethe, *Triers for Sampling Flour*.
2. Unpublished. Oct. 17, 1924. C. J. Morton, *Report on Sampling Flour for Moisture Determination*.
3. Food and Drug Review (1925) Vol. IX, No. 9, p. 18, A. E. Paul, *Flour Storing Experiment*.
4. Personal correspondence (1925). *Flour Samplers on Commercial Exchanges*.
5. J. Ind. & Engineering Chem. (1920) Vol. XII, p. 1102, C. H. Bailey.
6. J.A.O.A.C. (1925) Vol. VIII, No. 3, p. 287, *Report of the Committee on Sampling*.
7. Unpublished, May 26, 1919. *Central Food & Drug Inspection District Report on Sampling*.

Standardization

What It Is Doing for Industry

It has been through standardization of processes, formulas, machinery and selling methods, that the baking industry has made its amazing advance toward the front rank of the food industries.

Much still remains to be done before bread production is carried on with complete efficiency both in the shop and in distribution.

Declare ye among the nations, and publish, and set up a standard; publish, and conceal not.

—Jeremiah.

STANDARDIZATION is today the most important approach to greater industrial efficiency. The magnitude of the yearly savings to be made is almost incredible; they are to be measured, as Secretary Hoover has said, "in hundreds of millions and billions of dollars." Actual savings that are now being made in the automobile industry through organized standardization activities are estimated by the industry itself at 750 million dollars a year; it is these savings which have made the automobile generally available instead of its being only a luxury for the rich.

Industrial savings that are still to be made will similarly be the basis upon which the fruits of labor may be brought more generously into the lives of the people. With the growing complexity of modern life standardization and simplification must be invoked if we are to release our energies from the thralldom of detail sufficiently to be able to solve our increasingly difficult problems.

Standardization During the War

It is significant that the problem of putting greater efficiency into the conduct of the war turned out to be fundamentally a problem in standardization. Some of the great tragedies of the war were due to lack of standardization; the great Brit-

ish drive for example is said to have been postponed a year by ammunition that would not fit; on the other hand some of its greatest successes were made possible by standardization, the mining of the North Sea for instance: four hundred factories in the United States and Canada, each working upon some small part of a mine, were able to turn these parts out in prodigious numbers and yet so accurately were they made that the assembling was done after they were received in Scotland. The British tank-building program was handled in a similar way.

Standardization in Time of Peace

The way toward greater industrial efficiency which was found to be so important under the stress of war must now be followed for the purposes of peace. If our standard of living is to be advanced or even maintained in the face of the enormous material losses produced by the war in the face of the competition of countries with a lower standard of living there must be increased production. Increased production will be secured partly through invention and the improvement of processes but for the most part it must be looked for in the elimination of waste.

The greatest waste in industry is undoubtedly due to failure to carry out the principles of standardization in a thorough-going way.

Within the Factory

Every industrial plant is carrying on standardization of its own products and processes and its competitive success largely depends upon the cleverness and thoroughness with which it has studied and solved these problems. Standardization within the plant has been the essential factor in the development of mass production and mass production in turn has been the chief contribution of the United States to the development of industry.

Within the Industry

Company standardization, which has its greatest growth during the last half of the nineteenth century, gave rise to collective standardization for entire industries. Such standardization by industries, carried on by technical societies and trade associations, has for the most part been a product of this century. The present extensive use of electric motors and lamps would have been impossible had it not been for the collective standardization carried on in the electrical industry not only in fundamentals such as voltages and frequencies but also in such details as the interchangeability of lamp bases and sockets. The adoption of a standardized gage and of a system of interchangeable brakes and couplings was a necessary step in the development of our railroad system and upon this in turn rests our whole economic and industrial structure.

National Standardization

Just as standardization by individual companies led to standardization by industries so standardization by industries has in turn led to national standardization among industries as a whole, technical societies and trade associations here playing the same roles as the individual companies in industry standardization.

Standardization cannot reach its greatest effectiveness until it is treated as a national problem. Just as company standardization was a dominant characteristic of the last century, just as industry standardization was a dominant characteristic of the present century, so national standardization will prove to be a dominant characteristic of the present and of the future.

Relation to the Government

Standardization is essentially a problem in co-operation, but it is particularly important that the co-operation between government and industry should be harmonious and helpful. Under the existing arrangements, with industry immediately in touch with the practical needs and possibilities, with government alert to the balanced interests of the country as a whole and with the resources of great technical and research bureaus at its disposal, standards are being developed in an atmosphere of mutual understanding and helpfulness and without undue pressure from either side.

A Conservative Influence

Standardization like any other powerful tool is dangerous if misused; it may be begun too early, it may be carried too far, and it may be applied to improper fields. It is peculiarly important, with the rapidly growing interest in the practical use of standardization, that someone should be responsible for seeing that development takes place along right and reasonable lines. Standardization if wrongly used will produce a fixity and rigidity that will impede progress; but if rightly used it will vitalize and quicken industry; for it will release the mind and imagination from the pressure of unessential detail and the tedium of meaningless variety and give the opportunity for new advances.

A Loaf of Baker's Bread

It Is Packed Full of Possibilities for Interesting Uses

NEWS for kitchen reading is quite as important as breakfast-table current events. And one of the valuable departments of the family paper is the page which helps to solve the food problems of every home. Elizabeth Hallem Bohn, as Director of the Food Bureau of the New York Telegram, is making her columns rich reading for housekeepers who want to apply to their home making the best methods of feeding their families.

The department, which is so aptly called "Our Daily Bread," recently carried the following interesting and helpful suggestions for toasts.

"So great has been the advance of modern industry and advertising that it is now not only possible to purchase a loaf of superlatively well made and appetizing bread for a small sum, but the manufacturers of that bread have been enabled to tell you about the superior conditions under which it is made, of the excellent products which go into its manufacture, about the fine laboratories and spotless sunlight kitchens where its formula has been invented and the loaf itself turned out by modern equipment and under favorable circumstances which would make the home cook green with envy.

Surely one of the most matter-of-course actions in our daily routine is the purchase of a loaf of baker's bread. Often every slice and crust is not eaten after one or two meals, and the good tidbits now a trifle stale, demand some utilization in prepared dishes.

First Toast the Bread

Toast is beloved as part of the breakfast, whether one rises early or late, whether one likes it best thin and dry, or thick and well buttered. But often it can

pall upon the breakfaster, and when it does variations of toast are in order. French toast is a welcome change. A cup of milk, a beaten egg, a dash of pepper and one-fourth teaspoon of salt and mixed together, while the bread is being cut as for ordinary toast. Each slice is dipped very quickly into hot water, then into the egg mixture, and slipped into a saucepan in which a tablespoon of butter has had time to melt. Panfry each slice on one side for about two minutes, dot with butter, turn over and try two minutes more. Such toast may be served with butter alone or with jam, with cinnamon or with a cinnamon and sugar mixture. Sugar may be added to the egg mixture before frying, or a double decker may be made of two slices with jam, preserves or syrup in between. A paper-thin slice of cheese may be slipped between two slices of bread before frying, or tomato juice may be used instead of milk. Having suggested these variations, what about the English hostess' favorite accompaniment for afternoon tea—cinnamon toast?

Choice Recipe for Cinnamon Toast

We flatter ourselves that we have the most palatable cinnamon toast in the world on our tea table, made after a recipe of our own devising. It calls for slightly stale baker's bread, butter, a teaspoon of cinnamon and a cup of granulated sugar. These two are mixed together and placed in a shaker. The bread should be one-fourth of an inch thick, with crusts trimmed off, and must be toasted quickly so that it will be soft in the middle. Butter the slices generously, shake the cinnamon and sugar mixture over them, put the slices together in pairs and cut them in triangles. Place

them in a hot oven for a minute or two and serve them on a hot plate incased in a folded napkin.

Cheese Toast for Supper Parties

On slices of hot buttered toast spread grated cheese and add a dash of paprika. Set in a moderate oven until the cheese is melted. Long heating toughens the cheese and must be avoided. Bread, fried first in deep fat, may be used in place of dry toasted bread, and a bit of mustard may be added to the cheese if desired. Cheese toast has a strange way of satisfying the most active appetites and should be considered the main dish of an after-theater party or even a home luncheon.

Baker's Imitation Jellies

THE pure food officials of the states and the Federal Government have joined hands with bakers in an effort to drive misbranded and illegal materials from the market. This constructive work which is of real benefit to every baker who tries to purchase only materials which are pure and wholesome has recently been stimulated by a letter which was addressed by Dr. C. A. Browne of the Bureau of Chemistry of the U. S. Department of Agriculture to manufacturers and dealers in so-called baker's jellies. The letter reads as follows:

"The Bureau of Chemistry recently has had occasion to give consideration to the status under the Federal Food and Drugs Act of so-called bakers' jellies made from corn sirup, pectin, artificial color and added acid. The conclusion has been reached that these articles, which possess color and other physical characteristics similar to those of fruit jellies, are in fact imitation jellies and subject therefore to the requirements of the Federal Food and Drugs Act governing the labeling of imitations. Products of this kind made without the addition of artificial color but

prepared with crude pectin solutions imparting color resembling that of a fruit jelly are also regarded as imitations. The use of sugar instead of corn sirup does not relieve these products from such classification.

"Shipments of these articles within the jurisdiction of the Federal Food and Drugs Act should be labeled as imitation jelly or imitation fruit jelly. If glucose or corn sirup is used, they may be designated with either of the above names or as imitation glucose jelly or imitation corn sirup jelly. These designations should be prominently displayed in type of the same size on a uniform background and should be followed by a plain and conspicuous declaration of added acid, pectin, sugar, corn sirup or glucose, as the case may be, and artificial color in case artificial color is used.

"The food and drugs act is mandatory in requiring imitation products to be labeled as such. No alternative form of labeling is provided. Appropriate action will be taken against interstate shipments of these products unless they bear a label conforming to the requirements of the law with respect to imitation food products."

Pure food officials point out that all baker's products, such as jelly rolls, tarts and other items which contain imitation jellies, must be so labeled that the customer will not be deceived into thinking that the jelly ingredient is a pure article, free from artificial color and other materials which give it the appearance of genuineness.

All such activities by food inspectors and chemists will be welcomed by progressive bakers.

The home manager is learning that bread quality must vary according to the ingredients used and cost of production.

Riley.

The Press and Industry

*Trade Association Information if Well Written is
Welcomed by the Public Press*

By W. W. WOOD

Vice-President, Institute of American Meat Packers

Many newspaper editors do not understand what trade associations are trying to do and interpret the efforts of secretaries and publicists for industry as veiled attempts to mislead the public and tighten octopusian coils around it. But there is a way to tell an association story which will get first page attention and this parable of the grass-thatched roof industry is a boiled down course in journalism for directors of public relations.

THE relation existing between the public press and trade association information is about what one might expect of two agencies having several things in common but no acquaintanceship with each other.

There is one thing in particular which they have in common: Everybody in an industry thinks he knows how to run a trade association, and everybody in the world is sure he knows how to run a newspaper. Both are often wrong.

But their belief illustrates a point of kinship between newspapers and trade organizations—namely, the fact that each is a constructive social institution.

Of course the average trade association may not concede that the press is a constructive social institution, and most newspapers do not realize that the trade association is a social institution at all. Some of them think it is simply a specialized sort of—felony. Much of the grief arising in the relationship of these two agencies is due to their failure to comprehend fully each other's functions and obligations.

Consider this Case

A member of a trade association seizes on an idea of peculiar interest to him and rides it like a hobby. It is an idea of something that ought to be done; an ac-

tivity that ought to be financed and carried forward by the association. It will help his business; the lack of it hurts his business.

So he goes to the executive of his association, puts his egg on the executive's desk and says—"There! Hatch it quick!"

But it happens that the proposed activity, sound in itself, would appeal to and be supported by only a fraction of the membership. If undertaken, it would displace other activities appealing to more members.

It is not undertaken.

As a consequence, the member becomes indignant. He knows that if his proposal had been executed it would have helped his business far more than do some of the present activities of the association. He can think of one activity, in fact, which actually damages his business.

Now Consider this Case

The grass-thatched roof association finds that twisting the strands increases their tensile strength, a discovery of great interest—to the grass-thatched roof industry. Naturally, the director of public relations tries to do justice to the event. He writes about a column and a half concerning it, sends his yarn around to the newspapers, and, with his fellow officers, waits eagerly

for morning to see whether his story is printed on the right hand side or the left hand side of the first page. Of course, it isn't printed on either the right side or the left side, or even on the inside. It would not have interested as many persons as the story it would have displaced.

O, well, the officials of the association are broadminded men, and they realize the editor just didn't have the judgment they possess.

But—

A few days later, a grass-thatched roof caves in on a party of young folks dancing the Charleston and smears things up.

This time the grass-thatched roof industry gets the first page.

Nothing Is as Interesting as Trouble

It isn't right, it shouldn't be, but it is a fact that ninety-nine people out of a hundred are more interested in a building falling down than in a building standing up; in two men fighting than in two men talking; in conflict than in peace.

Now, most information originating in a trade association is constituted of quiet, well-behaved facts; the development of a new model, a reduction of sizes, a new marketing plan, a new method of production, or other things of those sorts. Nobody outside of the industry is much interested as long as everything is going smoothly.

Indeed, it often seems that only when a wrangle starts, do the newspapers turn their attention to trade associations; that if the Government threatens to administer a spanking, that is the only time when the newspapers are willing to send a photographer around to take the baby's picture. Sometimes the photograph is printed without waiting to see whether the spanking is administered, or even deserved.

Such a pessimistic view of the relationship between the public press and trade association information as I have just sketched is not fully warranted.

How the Meat Council Broadcasts Facts

No paper is aloof to constructive trade association activities provided they can be shown on their face to be of general interest. This often depends on the form of presentation. If the meat industry should issue a statement today saying that packers report spare ribs in heavy supply, no one except market editors would be interested; but if it should say: "The housewives of Chicago this week can get the most value for their meat dollar from spare ribs, which, because of the heavy supply, are, relatively, the greatest bargain in meat," then the city editor would be interested.

As a matter of fact the Meat Council of Chicago does issue such a story every week. Wholesalers and retailers are asked to say what cut is available at the most advantageous prices. This information is cleared to the papers without any trimmings. It always assists the housewife, and it generally helps producer, retailer and packer also.

Of course, if we tried to distort the facts or weight the statement down with a lot of unjustifiable propaganda, or write it at three times the proper length, your wife might fail to get some very useful marketing information this week.

Other Associations Do Good Work

Other associations probably are doing the same sort of thing and doing it better, but that little example from our own experience illustrates two ways in which some trade associations can improve their relationship with the public press:

First, by holding the copy down to its actual news dimensions—something that is very difficult for any association writer to do;

Secondly, by shaping the material in such a way as to indicate its relation to the interest of the general public.

Yet, I think there is a limit to which a

trade association should go in adapting its information to a paper's requirement of general appeal.

For example, when the grass-thatched roof industry found that twisting the strands increased tensile strength, it would have been possible to get publication for the facts by freaking the form. The result would have been headlines reading something like this:

Permanent Wave
Makes Roof Behave

Urge Curly Domes
For Cuddly Homes

An association which is interested more in getting publication for its information than in the kind of publication it gets, should have an easy task; clownishness always receives attention. While the light-touch story has its place, its misuse is also possible.

There is nothing very humorous about a fallen grass-thatched roof; at least not to the grass-thatched roof association.

When the association investigates the facts, it finds that the roof did not cave in; it came down intact; it fell because several uprights in the side walls gave way. So they curse and do nothing, or else they curse and write to the press.

Now, whatever else one may think of newspapers, he must admit that in the matter of complaints or corrections they are admirably fair.

Inaccurate Statements are Corrected

Our own association makes it a practice to correct inaccurate assertions about the industry which it serves or about the commodity which that industry sells.

We usually close our letters of correction with a request that they be published. It is a rare thing to find such a request denied. That, however short it falls of complete equity, seems a commendable

thing when one recalls that a letter of correction is generally not as newsy as the story which it seeks to set straight.

In that fact, lies the hardest problem to solve. A correction can never completely nullify the slander. What can we do to make sure that false assertions about our industries are corrected adequately? How can we be sure that a complete correction, as large as the false story, strides over the page abreast of it, instead of having such a correction, dwarfed by delay, chase vainly after the spreading misstatement?

There is no adequate remedy at this time. The most practical step to help solve the problem seems to be one suggested by Mr. Kinney of the Portland Cement Association. He suggested that every trade association should let the public press know that it stands ready and able to give out credible facts about the industry which it represents. Then if somebody with a careless whimsy for destruction throws a handful of bricks at an innocent industry, the newspapers will bring the missiles over for testing by facts and figures before reproducing them in type.

Printers Ink Addicts Are often Ridiculous

If editors knew how ridiculous are some of the things concerning industries which sometimes get into their columns, they would scrutinize even more closely the irresponsible charges often made by printers' ink addicts.

On one occasion, a minor United States employee stated that, with respect to a certain commodity the nation had been living on importations, and that current production had gone into storage. It so happens that the yearly importations of that commodity, as shown by statistics of the Department of Commerce, would have been but a drop in the bucket as compared with weekly national consumption.

Yet that story got into print, and was

read by several hundred thousand persons, many of whom believed it.

If Mr. Kinney's plan had been working—if the assertion had been referred to that industry's trade association before publication—Governmental figures could have been furnished to show how ridiculous and incredible the charge was.

A Fact-Finding Tribunal Needed

Moreover, if there were some disinterested, competent, fact-finding tribunal to investigate every charge published against an important industry and report its conclusions publicly, naming the accuser as well as the accused, it would make more cautious those who do not scruple to use sensational charges as a convenient springboard for leaping into print. Scalawags would have to find some better way to maintain themselves. If at any time such a plan should become practicable, it would put a ball and chain of facts on much forensic frenzy.

Meanwhile, there are other things, practicable now, which trade associations can do to improve the relation of the public press to the information they furnish. One thing, I think, is to understand a little better, to acknowledge a little more freely, the purpose and obligations of the press.

Naked and Unashamed

In general, an industry should be able to stand on all the facts; to justify itself by the complete sketch. It may feel forced to lay a light brush on a detail here and there, but the picture as a whole should be one of which it is unashamed. Any industry that wouldn't look reasonably good in the nude, doesn't need a publicity director.

No industry, and probably no individual, would claim absolute adherence to a creed of complete self-revelation. Yet—call it millennial if you like—that should be the goal of the trade association in its

relation with the public press. Let it stand on the facts, for that is where the industry must stand eventually; if it is giving essential service effectively, it will survive; if it is not, all the king's publicity directors and all the king's advertising managers cannot keep it alive.

Another thing that might improve the relation of the public press to trade association information would be to get across clearly the idea that the trade association stands for increased efficiency, for simplification, for standardization, for reduced costs, for reduction of the price spread between producer and consumer.

Various local trade associations, some of them operating under express permissive state legislation and none of them subject to the Sherman Act, have by the effectiveness with which they stabilize prices, given an erroneous impression of the activities of national associations, which are prohibited by law from engaging in such efforts.

We should substantiate and maintain the idea that the big national association, reducing costs, cheapening production and preserving competition, is not the enemy, but, the friend of the consumer.

But those are policies. The main considerations are that it shall approach its press relations with a full comprehension of and, some deference to, the viewpoint and purposes of the great social institution at whose door it is knocking; that it shall represent an industry which renders a social service and renders it fairly; and that it shall be willing to stand on a fair presentation, a fair realization, of that service. In the long run, the facts always prevail. When that time comes, the relation of the press to trade association information will be all that anyone has a right to ask that it be. Let us all try to do what we can, in policy and in detail, to hasten the day.

Research Chases Dirt Away

How Cleanliness, the First Care of the Baker, May Be Obtained

By THE CHEMICAL RESEARCH DIVISION,
The Proctor and Gamble Company

THERE is no better advertisement for a bakery or any factory where food is prepared than a "cleanliness" slogan.

One of the most effective means of persuading reluctant housekeepers to accept ready cooked foods is by cleanliness publicity. Much has already been done in this way to correct the impression that foods prepared by factory methods are not clean, but there still remains some need of further education both for the consumer and for the factory management.

It is not a simple problem, in even the most modern of buildings, to keep the standard of cleanliness up to what it should be. There are so many apparently more important things, such as quality and quantity of production, which, of necessity, must have first consideration.

But the question is—are these factors really more important, or do they not depend more or less directly on cleanliness?

Even though it is admitted that, theoretically, cleanliness is of paramount importance, the other things still continue to intrude themselves into the foreground of the manager's problems. Probably one of the reasons that these other problems receive first consideration is because the manager knows exactly how to deal with them. If the machinery stops he calls in a mechanic, if a formula fails, he checks up the weighing mechanism or investigates the various ingredients, but for the care of the building he just hires a janitor who may or may not happen to know the rudiments of cleanliness.

Every factory manager should have for

his own information an understanding of the principles of cleaning. It is not sufficient to simply clean the machines and wash the floors at the end of the day's work and count the job finished. The effect of the kind and the continued use of cleaning solutions on different materials should be known.

The Principles of Cleaning

In general for floors of the type commonly found in bakeries, the most satisfactory cleaning solution consists of a large proportion of alkali such as modified soda with a smaller proportion of soap dissolved in hot water. Or for convenience a prepared soap powder of this composition can be selected.

Straight alkali is not as efficient a cleaner as alkali with some soap added. Nor does pure soap claim to be as effective for loosening dirt as the soap and alkali combination. The alkali increases the detergent value of the soap tremendously.

Floors which are continually washed with an excess of soap are inclined to become slippery (a dangerous condition), as the usual mopping process never entirely rinses off the soap.

Neglected Floors Need Refinishing

For a floor which has been long neglected, such drastic treatment as scraping and refinishing may be necessary, or, if it is not too bad, a thorough scrubbing with a stiff brush and such a solution as described above may be sufficient.

But for ordinary care, a daily mopping with soap powder in solution in hot water followed by a thorough rinse with clear water will keep the floor in good condi-

tion. As occasional scrubbing is good for any floor.

Any floor with a finish, such as linoleum, which is injured by alkali should be washed with pure Ivory soap, or, if a slightly alkaline solution is used, it should be rinsed off immediately and thoroughly.

Methods for Walls and Woodwork

For the washing of walls and woodwork, a more dilute solution of Clean Quick powder (approx. 3 ounces per 10-quart pail) may be used. The usual method of procedure is to first sponge a section of the wall with the solution followed immediately with a clear water sponging for rinsing purposes.

For light colored woodworks, especially enamels, Ivory soap pastes have been used extensively and with great satisfaction. To make this paste, dissolve one-half bar (6 oz.) of Ivory soap in one quart of hot water. After the solution has cooled to a jelly, apply it by means of a wet cloth directly to the painted surface. Kerosene is sometimes added to this solution to increase its efficiency as a solvent for grease. Always rinse the washed surface with clear, warm water and dry with a soft cloth.

Be a more intensive student of your business. Become better informed by being better read and by this, read your bakery trade publications. No other industry has a finer quality of trade magazines than the baking industry. A few dollars a year will bring to you two or three of the best mediums of information you could ever expect—they will afford you ideas of priceless ideas. The trade journal gets a man out of the rut and out on the Way to Greater Sales.

Charles W. Myers,

Director of Trade Relations, Armour & Co.

"Oh! happy he whom Heaven hath fed
With frugal, but sufficient bread."

Baker's Bread Provokes No Tears

THE old story about the bread that mother used to make is fast becoming obsolete. We must change it to the bread that grandmother used to bake. The farther back we place it the better our fond recollections become and the less likely it is of proof. The fact is that mother doesn't do much bread baking any more. She buys it ready made like she does her clothing and her music rolls. The situation does not provoke us to tears.

No one is wise who minimizes the excellence of home baked bread at its best, but there is the difficulty. It lacked uniformity of quality. If the weather or the yeast or the flour, or fire wasn't just right mother's bread and father's temper and Johnny's digestion were likely to be bad too. Furthermore bread making was another one of the things that made house-keeping drudgery because of its never ending necessity. The number of Texarkana bakeries; the economy, cleanliness, and uniformity of their products are just another evidence of the emancipation of women. These bakery products are to be found at every cross roads store for miles around. Their universal use should be welcomed by men and women alike.

—Texarkana Press.

Educating the Public

A public taste which has been led away from bread can be brought back to bread. Nutritional habits have well defined and basic causes. The cry for bread which has started many a revolution, and changed the map of the world was but the voice of nature demanding food that the race of man should not perish.

"Open thine eyes and thou shalt be
satisfied with bread."

—Proverbs xx. 13.

Up From The Soil

The Story of Wheat from the Field to the Table as Told in a Volume from The Manhattan Library of the Bank of the Manhattan Company

Our loaf of bread is a rich inheritance through which Nature with unfailing patience is endeavoring to teach man that her edicts cannot be changed and that the laws of human relations which have so much to do with the transmutation of golden wheat into our most perfect food must be observed. This final installment of "Up From The Soil" clearly shows how the perfect loaf is a symbol of interdependence and co-operation which expresses the common interest of farmer, railroad, miller, baker and bread consumer in the general welfare.

Chapter Ten

THE NEWEST INDUSTRY

IN A small town of eastern Pennsylvania stands an interesting museum. Here, to the extent of many thousands of pieces, a lifetime of work has brought together a collection of tools, emblems and devices of the day of hand craftsmanship. The collection is designated "The Tools of the Nation-Maker." It shows the aids of all the occupations practiced in the shop, the farm and the household in the days preceding the coming of machinery; which is to say, roughly, the period antedating the Civil War. To visit it is to realize that the so-called industrial revolution has occurred within the memories of many now living.

The effect upon human society of this revolution has been more profound than we yet can comprehend. In a seemingly irresistible way, it has brought about large scale production and the change of ownership from that of individuals acting separately, to individuals acting together in effective voluntary co-operation, as corporations.

In many lines, this process seems to have been fairly rounded out, but we cannot look back at the baking revolution, for we are in the midst of it. We can

only glimpse a trend here, a possibility there. Yet, with it all, we realize that in an increasing measure the housewife is being permitted to enjoy a new-found leisure. The over-heated kitchen of bread-making days seems to be rapidly becoming obsolete, and yet the family is as well fed as ever, on bread that averages much higher in quality and at a cost estimated at less than twelve dollars per person for a year's supply, or an average of slightly over three cents a day. The average workman's daily wage will buy four times as much bread as would the day's wage of a worker a century ago.

Even with the cheapening of the price of bread through modern industrial methods, much misunderstanding still exists concerning the share received by each participant in the production of a loaf. Extensive investigations to discover the facts have been made by several public authorities. Conditions were found by them to vary slightly in different cities, but an analysis made by the Department of Agriculture in 1924, of the retail price in New York City of a one-pound loaf (9.73 cents) served to illustrate fairly closely how the consumer's money is distributed.

This analysis showed that the baker received 5.62 cents on each loaf, but out

of that he had to pay for yeast, milk, other ingredients and manufacturing materials, and the expense of mixing, kneading, baking, selling and daily delivery. It was estimated that these items absorbed five of the 5.62 cents, leaving a profit per loaf of slightly less than two-thirds of a cent.

The other participants, namely, farmer, elevator, railroad, miller and retailer, received portions of the consumer's payment running from seven one-hundredths of a cent, in the case of the elevator, to a cent and a half in that of the farmer. In each instance, of course, the portion was obliged to cover expenses as well as profits.

The figures on the whole do not seem to permit the existence of "profiteering" profits for any of the various industries concerned.

Baking, like other industries, is developing into large units. One organization alone requires each year over 3,000,000 barrels of flour and proportionately large volumes of sugar, eggs, milk, butter, shortening, yeast, raisins, paper containers. To such organizations the elimination of many small wastes is possible.

One interesting new development has had an important effect, in two directions. Skimmed milk, formerly of insignificant value to farmers, is now sold by them at a good price for use in about ninety per cent of bakers' bread. This is one of those examples of waste saving that work to the advantage of all. The farmer now derives an income from the sale of a hitherto unsalable product of great food value, for which experts had long sought a use, while the baker discovers that his bread is thereby made far better. Incidentally, the baker now furnishes a new incentive to the wheat farmer to diversify his output to the extent of producing milk.

Remarkable as have been the results

of the whole industrial revolution in the enrichment of modern life, its benefits are nowhere more readily apparent than in the great new industry which has grown so rapidly from an age-old craft.

Chapter Eleven

A RICH INHERITANCE

IN TRACING the story of bread, we have taken a roundabout trip of hundreds of miles, and seem to have returned to our starting point, namely, the neatly wrapped package which was delivered at our door an hour ago from a nearby grocery, in response to a telephone call.

We tear off the translucent wrapping; our eyes note the golden brown of the crust, and our nostrils enjoy the fragrance of a freshly baked loaf. But these familiar sensations are now associated with a new feeling of respect. Yesterday, we would have considered it merely another loaf of bread, today it epitomizes for us much of human history and symbolizes some of the profoundest truths that affect society.

This loaf is the latest link in a chain that connects us with the remote past. It could not have come to us in its present form save for the myriad happenings of which we have taken a hurried glimpse. It represents the endless pageant of human progress marching up out of antiquity, looming larger and clearer as it approaches the present, and presenting distinct and modern features, such as tractors with the power of sixty horses, drawing their gangs of plows; harvesters that reap and thresh as they go through billowing seas of ripened wheat; thousands of loaded grain cars speeding over a network of railways; wheat markets, where the change of a fraction of a cent in price per bushel is immediately reported; giant grain elevators, where the golden streams find reservoir; mammoth flouring mills,

that exact from each kernel its inmost riches; modern bakeries that, in our own day, have transformed bread-making from the simple handicraft that had lingered since long before the time of Rome into a systematized and scientific manufacture; the familiar corner grocery, to be found not far from every home; the convenient telephone, and the automobile that brings the loaf to our kitchen door.

But this is not all. Ever since man began to think, Nature has been endeavoring to teach him that bread comes up from the soil through the operation of laws which he can utilize but cannot change. In so doing, she has been speaking in words that are clear, although often disregarded, of other laws that are no less her own—laws of human relations. She is ever beckoning to the scientist, the mechanical engineer, the economist, the organizing genius, to come and discover the endless bounty which still waits in her storehouse, so that the revelation shall dispel the age-long delusion that richer life is to be found in the dominion of man over man rather than over Nature. All this is in the loaf when considered by the understanding mind.

Last of all, our loaf symbolizes for us those ideal social conditions which should be attainable within our wonderfully favored land, and yet by no means have been attained. It is an expression of unity based on diversity, a new thing arising out of elements that have been drawn into co-operation for a common purpose.

Nor is this merely a figure of speech, for already there has come about a degree of systematized co-operation that points the way to the wonderful America of tomorrow, if men will but follow its indication. We have seen how great organizations, created by the various industries that make possible our loaf, are working together, more or less consciously,

not to control markets and raise prices, but to **lower** prices, increase production, improve quality, facilitate distribution, broadcast essential knowledge and otherwise contribute to the welfare of the whole producing and consuming public, that is, to America itself. It is suggestive of the vast co-ordination which characterized our national effort during the war years of 1917 and 1918, only in this case it is directed to purposes that are uniformly constructive.

And now, with the loaf as our symbol of interdependence and co-operation, it is easy to see how seriously detrimental is any spirit of strife that sets country against city and city against country; that ranges farmer against railroad and that tries to stir up antagonism between consumer and producer, where, rightly understood, the welfare of each is dependent upon that of the others.

Never must it be forgotten that every attempt to enrich one class at the expense of another gains, if successful, but a fictitious advantage, short-lived and soon followed by the disadvantage it was aimed to forestall; while every effort conforming to the American principles of individual initiative and voluntary co-operation, and directed toward the extension of man's dominion over Nature, yields a blessing not to America alone, but to the whole human race.

Standing today in the presence of a vast civilization which the earth has produced through man's reaction to the laws of Nature, it is possible to sense something of the accumulated responsibility which rests upon the present generation. Up from the soil of an empty planet this marvelous growth has been developed during ages of toil and suffering; back to the soil it must not be allowed to wither through the ignorance or neglect of its inheritors.

(To be continued)

Books for the Baking Laboratory

THE CHEMISTRY OF WHEAT FLOUR, by C. H. Bailey, Ph. D., Professor of Agricultural Biochemistry, University of Minnesota, American Chemical Society Series, Chemical Catalog Co., Inc. 324 pp. New York, 1925.

Prof. Bailey's Chemistry of Wheat Flour is a creditable and welcome addition to the series of scientific and technical monographs published by the American Chemical Society. It is surprising that in spite of a rather extensive scientific literature on the cereal grains and their products scattered through special journals and other published sources, general or authoritative texts or reference works treating of this field are few in number and for the most part inadequate.

At present there is no single book in the English language that presents an up to date and comprehensive survey of this field in the light of recent research and contemporary conceptions in physical and biochemistry. It is apparent from a reading of the Chemistry of Wheat Flour, that Prof. Bailey has made a noteworthy contribution to the data of wheat flour in this excellent monograph.

The general method of presentation has been developed by the author from a consideration of three fundamental points, first, the wheat, from which flour is manufactured, second, milling, or the process of producing flour and finally, the adaptability of flour for breadmaking requirements.

The breadmaking property of flour is recognized as the most important aspect of the problem. In view of the difficulties in the way of a satisfactory treatment of the biochemistry of the baking process, the author has deemed it advisable to restrict his discussion of baking to the possible or probable correlations between "Composition, or physical and chemical properties of flour and baking qualities."

The subject matter of the book is well organized and arranged under the following chapters, historical, wheat in its relation to flour composition, growth and development of the wheat plant and kernel, influence of environment on the composition of wheat, defects and impurities in commercial wheat, storage and handling of wheat, chemistry of roller milling, changes in flour incident to aging, color of flour and flour bleaching, flour strength and enzyme phenomena, flour strength as determined by the proteins of flour, and colloidal behavior of dough, an appendix on the chemical and physical constants of wheat oils, a twenty page bibliography of references and an author and subject index.

The historical introduction is brief but mentions some of the landmarks in the milling process. American technical progress in milling seems to date from the middle of the last century. In 1870 the middlings purifier was introduced into Minneapolis mills, roller milling came into use in the 80's and flour bleaching in the 1900's. These innovations have been responsible for the major technical and commercial development of the milling industry, but they have not been entirely unmixed blessings, since in their wake came the disciples and spiritual descendants of Dr. Graham, including our contemporary anti-white flour propagandists who still trace all our physical evils to the products of roller milling.

The characteristics of the various classes and varieties and the breeding of wheat, are discussed in relation to gluten content and baking value. The author emphasizes the pitfalls that lie in the way of generalizing from baking data, which contains many variables in this connection.

An interesting summary of important literature in plant physiology and agricultural chemistry relating to the growth and development of the wheat plant and kernel is presented in chapter three, including the valuable analytical data of Woodman and Engledow on the chemical development of the wheat kernel.

Further important agricultural, both chemical and agronomical papers are reviewed in the discussion of the complex problem of the influence of environmental factors on wheat composition, such as soil and climate. Prof. Bailey has summarized briefly some of the general conclusions of American and foreign studies. He indicates that climatic conditions are responsible for greater variations in wheat composition than other factors with the possible exception of irrigation, and that soil texture is of more importance than soil composition.

Frosted wheat, rust infection, sprouted wheat, heat damaged wheat, admixtures of foreign seeds and yellow berry as defects and impurities of wheat are subjects in which farmers, millers, milling chemists and grain inspectors are interested, and valuable literature is cited on these subjects.

The storage and handling of wheat has an important relation to the milling and baking properties of flour. Considerable attention has been given to these problems, among which are sweating, heating, moisture conditions, and changes in weight during storage. The respiration

studies of Bailey and associates have brought forth important data on the heating of wheat in storage.

The relation of the amount of moisture present in the wheat to increases in temperature on storage is highly important and the work of the author, Burchard and Alcock, Phillips and others is cited. None of these investigations appear to have definitely fixed the maximum amount of moisture that wheat may safely carry during storage, although the range seems to be around 14 to 16%.

A brief description of the milling process is given in chapter six, followed by a discussion of the role of moisture in roller milling, the chemical composition of mill streams, criteria of flour grade, enzymic activity of wheat flour grades, physico-chemical methods for the determination of grade, and definitions.

These subjects have important practical relations and the author presents informative citations and data. The various methods which have been proposed for establishing flour grade are reviewed, though few of them are applied as extensively as the ash determination which seems to date from the work of Mayer in 1857.

As Bailey points out, "the inorganic ingredients of the ash are not of themselves directly responsible for the properties of the flour with which the percentage of ash is correlated. An increasing ash content is ordinarily assumed to indicate a diminishing degree of refinement of the flour, and the latter in turn implies a progressive impairment of baking qualities, color and keeping qualities. The substances found in the ash remaining after incineration of the flour might be substantially increased, however, without necessarily impairing any of the flour properties mentioned. In fact, it is likely that an improvement of baking quality might result from superimposing an equivalent quality of the constituents of the ash upon a short patent flour. The ash content of flour is of significance, therefore because it is correlated with the flour properties in question, rather than because it is directly responsible for those properties." (pp. 151-152).

The expression of the buffer value of flour after the Van Slyke ratio, appears to have found its first application in flour analysis by the author's recalculation of the Bailey and Peterson data. The relation between ash and buffer value is shown clearly in Table 103, page 167.

Existing difficulties and differences of opinion and lack of agreement on definitions for flour grades is well brought out by the author's discussion of this subject. At present the problem is highly confusing to both experts and laity,

though the impossibility of establishing standards and definitions on a basis of chemical and physical constants is generally recognized. The 1923 report of the Committee of the National Millers' Federation presents the most recent ideas of the milling group on the subject and Prof. Bailey has included suggestions on page 176 that are in line with simplification of definitions.

The changes that take place in flour during aging have long occupied the attention of milling and baking investigators. In view of the importance of the relation of moisture content and temperature to keeping qualities, the author notes that no one has yet conducted and published a critical and comprehensive study of the problem. Such an investigation would have an important relation to the existing Federal Standard for moisture of 13.5% which has recently been discussed by Snyder on other grounds in connection with methods for determining moisture.

The problem of the increase in acidity of the hydrogen ion concentration of flour on aging is reviewed, but the author believes that this is not the only factor concerned in the improvement of baking qualities and that other changes take place which have thus far been overlooked or eluded study.

The color of flour and various bleaching processes receive detailed treatment in chapter nine. The subject matter includes references to most of the important work on the subject from caratinoid pigments to the use of bleaching agents. The question of bleaching and its effects has many social, economic and legal relations and it will be long before it is satisfactorily settled.

The remaining chapters of the "Chemistry of Wheat Flour" on the great problems of flour strength, activity of enzymes, and the colloidal behavior of dough is perhaps the most interesting and valuable section of the book from the standpoint of contemporary flour research and theory. The Minnesota contributions to this knowledge in which the author has participated are among the outstanding investigations in this field. An adequate review and summary of them will be found in the monograph, but other studies have not been neglected.

Most useful and important data has been assembled on the proteins of wheat in relation to their chemical and physical properties and also a valuable summary of the physical and chemical properties of flour. Some of the colloid problems of dough conclude the monograph.

We venture to predict that the author will soon bring out a second edition if wheat flour investigation continues at its present rate of activity.

C. B. Morison.

The Place of Pie in the Diet

By WINIFRED STUART GIBBS

Food Specialist

THE Puritans of conscientiously long faces are popularly supposed on principle to have frowned upon anything that was essentially attractive. There may be an element of truth in the legend but like most others of dogmatic character it must be modified. Certainly they did not frown upon the great American dish of pie, and it is equally certain that they must, being human, have liked it! At all events, we, their descendants, owe them much, and among their culinary legacies are apt to rate the American variety of pie very high indeed. It would be fascinating to pause long enough to trace the history of pie. We might begin with the days in old time London when the street vendors sang musically concerning the "all'ot" succulence of their wares. The tales of "tossing for pies" on the street are rich in human, yes and historical interest, but we must get on with our modern version of the story, which is to say the place of pie in the diet.

In spite of its appeal to the palate pie as we know it now had for a considerable period, a bad name. Indigestion was said to lurk within the juicy depths of that universal masculine (and feminine, although perhaps to a less degree) favorite, pie! Mothers banned its consumption except in moderate portions and dietitians sent forth dicta to the effect that pie was anathema for any one whose digestion required coddling. Like other ideas there is a germ of truth in this one, but unless we bring a reasonable intelligence to bear on the question we are likely to needlessly deprive our dietaries of a food very high in energy, rich in life, promoting mineral salts and abounding in wholesome sweets.

Latter day work in food research is proceeding along such sane and orderly

lines! Today we refrain from condemning a food simply because, badly prepared, unwisely introduced into the diet and eaten to excess, it "causes indigestion." Rather do we apply ourselves to the task of finding out the whys and wherefores of its effect on nutrition. We ascertain just what service the food in questions renders the body and we then proceed to fit it into a scientifically planned dietary.

The learned man who described mince pie as "a palatable preparation of high caloric content" knew what he was talking about! Did he hold with the then current conception regarding the indigestibility of pie and its generally deadly effects? He did not! On the other hand he did not advocate an indiscriminate use of pie as a substitute let us say, for bread and butter. He knew and taught that pie must be used with due regard to all of the factors that enter into a well-balanced diet. He knew that because of its very food value, its concentrated character, it was not a food for young digestions not yet arrived at the stage of development where they may safely attack rather intricate combinations of food elements. On the other hand, he taught that, given maturity of the digestive tract, normal activity, attention to the proper proportions of food elements in the average diet, pie offered much.

So, we do not give pie to the tiny toddlers. The two or three or four or five year old digestions are so constituted that dishes made of the fewest possible elements are necessary for health. For these tots we provide, if we are wise, energy and body building material in the form of bread and butter, accompanied by the strained fruit juices. For their school-going brothers, however, as well as for their "sisters and their cousins and their aunts" we know that pie affords a nourishing food.

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